

# THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED

The Aluminum World—Copper and Brass—The Brass Founder and Finisher

## ELECTRO-PLATERS REVIEW

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### Plans for Revival

By ADOLPH BREGMAN

Managing Editor

#### A Summary of Present Day Opinion on How to Emerge From the Depression

WE have reached the stage of the depression of acting for the future. We no longer are content to wait for a "temporary" dislocation to right itself but are searching hard for the right machine to pull us out of the hole. We must have a plan, and consequently everybody has a plan. We are now deluged with plans from the most conservative to the most revolutionary, from the largest and the smallest organization and from the best known and the most obscure individual. Every group has its plan, and in these days of widespread publicity, almost everyone gets a hearing. Many of these plans yield to the human urge for criticizing others and expend most of their effort in blaming our leaders. Some are just and some are unjust, but the sport of blaming and carping goes merrily on. Some of the most familiar and most abused phrases are "Lack of Leadership," "We must get to the Root of the Trouble," "Midgits in the Seats of the Mighty," "We Need Fearless Leaders," and so on ad nauseam. These are beautiful generalities, easy to write and repeat, but many of our numerous advisors forget that what we really need in our present straits are details—practical, accurate, farsighted and with common sense.

##### Some of the Plans

But let us go to some of these plans: The most recent and perhaps the most widely publicised is that of an Economic Planning Board. It looks most alluring on paper but carries with it the danger of helplessness if the board has only advisory powers, and possible economic strangulation if the board can enforce its decisions. Such a plan is too vast to be lightly dashed off. Should it be applied through the medium of the growing trade organizations in each industry, for which we would need re-

vision of the Sherman law, or through a General Economic Council?

Another very tempting prospect is to have the Government issue bonds up to \$5,000,000,000 and start spending the proceeds. This might start a fresh rise in business. It might also wreck the Federal financial structure beyond repair. The tariff has been the target for volumes of criticism—much of it just. And yet who would be willing to take the responsibility for a deep slash in much of our present schedule, with the history before him of our experiences in 1893 and 1913, both years of deep depression immediately after a sharp tariff cut. The present schedule has few public defenders, but had we not better leave its revision to the Tariff Commission, who should gain momentum as they go on?

We have before us a statement that if 200 manufacturers of sufficient size united on a project of modernizing their plants without delay, they could reverse the present trend and start us up. It sounds like a fair guess. Will 200 of our largest and most powerful companies please volunteer? We know that a number were supposed to have done just this thing in 1930. Would others be willing to follow suit now?

We have suggestions for spreading employment by dividing it into shorter time periods, among a larger number of workers. We have urged upon us the six-hour day. The former suggestion is being put into operation in hundreds of plants. The latter has been taken up by one of the most powerful American corporations—du Pont. We are advised to press unceasingly market research, to develop new ideas and products for sales leaders and we have before us the outstanding examples of the Aluminum Company of America and the International Nickel Company who have had such marvelous success

in spreading their fields of activity. We are advised to push building operations because of the present low costs which are from 20 to 35 per cent less than in 1929.

It is suggested to us by no less an authority than one of the world's largest silver producers to remonetize silver (without a fixed ratio), to supply some inflation to stimulate trade. Inflation like a stimulant to a sick patient may be an excellent aid to revival, but how are we to protect ourselves from over-inflation, which, in one form or another has always been the cause of our depressions?

We are advised to invest heavily abroad in undeveloped sections to raise their standards of living and thus develop markets for our products. M. Citroen, the great French automobile manufacturer, has put forth a very ingenious scheme for co-operative action between American and European manufacturers of automobiles in developing markets in the rest of the world which at this time lie fallow. We are told by German industrial leaders that war debts and reparations must be scaled down and even eliminated. Presumably we could stand such a loss, but what does France say to this plan? And we all know that no radical change in the international status quo can be put into effect without France's agreement.

Our present situation is admittedly bad. Such a reliable organization as the Standard Statistics Company recommends holding the stocks of only two lead and zinc producing companies, only two copper producers and two other mining companies. As regards buying, they are silent. The second quarter of 1931 was better than the first, but not up to seasonal expectations. The third was off, badly, and the fourth, while it seems to be up a little, is also below seasonal requirements. This disappointment has been reflected in the stock market. At the same time those corporations which were able to improve their positions in good times, and were sensible enough to do so, have, while suffering decreased earnings, put themselves in more liquid condition, obviously making every effort to be saving rather than adventurous. Good business? Yes, but not of the type that pulls us out of a depression.

We have the old familiar advice to cut costs by lowering wages, thus making it possible to sell more cheaply and stimulate buying. Whether we like it or not, whether we approve it or not, wages have been and are being cut. Are we improving? No trustworthy signs of it have appeared as yet. Perhaps there has been insufficient time for these cuts to take effect. Perhaps it is because the cuts are unbalanced, too much in some industries and not enough in others. Perhaps they are out of line with the decrease in living costs. We have no accurate statistical record of the average percentage decline in wages. We have, however, the statement of the U. S. Department of Labor to the effect that the cost of living has declined about 15 per cent since 1925. It is estimated also that the total decrease in wage dollars received is about 40 per cent since 1929. It seems that we are facing the real danger of uncontrolled and panicky wage-cutting, which may permanently impair the nation's purchasing power and permanently turn us away from our industrial philosophy of high wages to make high purchasing power to make prosperous industry.

Many recommend unemployment insurance plans undertaken through the voluntary cooperation of employers and employees. Some plans rigidly exclude government contributions, doles and charities upon the grounds that governmental unemployment payments, be they federal, state or local, are not a true cure for unemployment. Others insist upon government cooperation in control or money or both.

Probably the best and most authoritatively backed ideas have come from Gerard Swope, president of the General

Electric Company, whose plan rests upon five basic principles:

1. Regularity and continuity of employment through the stabilization of industry, with unemployment insurance as a reservoir of safety.
2. Leadership by organized industry to avoid the lack of uniformity and co-ordination inseparable from direction by the legislatures of the states.
3. Standardized forms of reports to stockholders to enable them as owners to be thoroughly and continuously informed as to the progress of their business.
4. Co-ordination of production and consumption on a broader and more intelligent basis for the particular benefit of wage earners.
5. Promotion of individual initiative and enterprise, and the protection of the public through Federal supervision.

To discuss this plan adequately, taking into consideration all of its possibilities, is not feasible in the limited space available here, but certainly it must be said that no plan has been more comprehensive, and while it may seem to call for more and more co-operation between government and business, the author of this plan, on his past record and present position, can hardly be accused of being radical.

#### We Should Have Co-ordinated Plans

A studied consideration of the wide variety of suggestions coming in from all quarters seems to point out not only the need, but the general acceptance of the idea that we should have what is known abroad as "rationalization"—what we call planning—for such an undertaking. We have no existing agency. We are operating in our old "each for himself to take it or leave it alone" fashion. Our efforts are widely scattered, many individual struggles being commendable and in some cases effective, locally. But such efforts are useless against the far-flung catastrophes, which have occurred four times in the past thirty years.

We are perhaps justly afraid that nation-wide planning will mean nation-wide control of industry by outside agencies, with resultant throttling. We seem to admit as a whole that our knowledge of government is far behind our knowledge of the management of industry (which is in turn far behind the knowledge of exact sciences). How then can we risk putting government into business? The problems are too great and our factual equipment is too small.

#### The "Good Old Days" Were Not All Good

Nevertheless, in spite of these fears, the trend seems to be steadily toward planning. The "good old days" of free play were, to those who can remember them clearly, not always so good. There has rarely been a time when they were not spotty or unbalanced. Even in 1928 and 1929 coal, lumber, textiles and farm products were anything but gay. It seems to be more and more generally agreed that what we need is not booms but balance. It would be much better to have all industries on a fairly good level than to have some high up and others far down. How can this be achieved without broad planning?

The recently announced device of President Hoover, to release the frozen bank assets by the formation of a national rediscount bank, is a step openly in this direction. It is intended primarily to stabilize and save the banks, and in so doing, to release the funds for business. His later plan for district mortgage banks is similar with home building as its focus. Here are clearly moves to control two fields as a whole, co-operatively, at the same time working, with the government.

Why should not industry do the same?



## Comparison of "Economic Stabilization Plans"

PUBLISHED BY THE BUSINESS BOURSE, NEW YORK, AS SUPPLEMENT TO BOOK, "THE SWOPE PLAN; DETAILS, CRITICISMS, ANALYSIS"

PLAN	EFFECTIVE POWER PROVIDED:	GOVERNMENT REGULATION PROVIDED:	ANTI-TRUST LAW AMENDMENT:	UNEMPLOYMENT PLAN:	OTHER PROVISIONS:
Swope Plan	Trade Associations; Membership in which is compulsory after 3 years for companies with 50 or more employees. Rulings mandatory.	Continuous Regulation by Federal Trade Commission or other body.	Amendment Probably Necessary.	Elaborate provision for life and disability insurance, pensions and unemployment insurance; benefits to follow employee when he changes job.	Standardized forms for quarterly financial reports to stockholders. Plans to stabilize price and equalize production with consumption.
U. S. Chamber of Commerce Plan	National Economic Council; power not mandatory, but only suggestive.	No regulation.	Limited Amendment Urged as Desirable.	Local aid urged, and individual corporation plans; with definite reserves. Public works planning.	Steps to disarmament. Curb on manipulative speculation.
American Federation of Labor Plan	National Economic Council; power not mandatory, but suggestive. Development of more scientific plan of production.	No regulation.	Amendment Strongly Urged.	Calling of National Conference to spread jobs; maintenance of wages; guarantees of jobs; long-range stabilization plans.	Five-day week and shorter day immediately; prohibition of child labor; gigantic program public building; stronger employment agencies.
"Forum" Plan (Jay Franklin)	"U. S. Incorporated"; 5 per cent of corporation and partnership control stock of all business to be turned over to government, for 5 years. Key industries to be grouped into regional or national monopolies. Dividends to citizens later issued in form of consumption goods at cost.	Regulation through "Treasury Bureau of Corporations"; also "Federal Forecasting" Bureau; and "Federal Trade Board."	Amendment or Annulment.	Organization of "State Labor Militia" and "Standing Labor Army" of Unemployed; Production quotas and wages fixed by regulatory bodies.	Revision of Income Tax; heavier in higher brackets; development of great national waterways. International gold conference, and special session of Congress for revision of Federal Reserve and anti-trust laws to compel membership in Reserve of all interstate banks, guarantee deposits, enlarge bank examination, include in discounts eligible certain classes corporation securities.
Stuart Chase's Plan	"Peace Industries Board"; revival of War Industries Board for Ten-Year Plan; seven members; using coercive, mandatory power; confined to 20 or 30 basic necessary industries. Functional divisions: Planning and statistics, investment and banking, conservation and waste, labor relations, distribution, legal, public health and sanitation, publicity, industrial psychology.	Continuous Regulation and Review.	Amendment Permitting Combination.	National Employment bureaus, reduction of hours, unemployment insurance, gradual raising of wages; allocation of labor.	Suggested absorption of Federal Trade Commission, Interstate Commerce Commission, Federal Reserve Board, Federal Power Commission, etc.
Associated General Contractors of America Plan	Grant by Congress of greater power to Federal Reserve Board (special session to be called immediately). Bond issues to be authorized for Revolving Fund to buy special tax bills against specific construction and improvements; bond issues also for increasing public and semi-public construction. Federal Reserve to guarantee solvency of banks and force hoarded capital to	Greater degree of financial regulation; licensing of contractors; establishment construction credit bureaus.	No Amendment Required.	Stimulation of employment through greater building and construction activity.	Issuance of state bonds for public buildings; development of home loan banks; propaganda to educate public that increased public services mean increased taxes.

circulate. Public debt retirement to be deferred.

PLAN	EFFECTIVE POWER PROVIDED:	GOVERNMENT REGULATION PROVIDED:	ANTI-TRUST LAW AMENDMENT	UNEMPLOYMENT PLAN:	OTHER PROVISIONS:
<b>Mathew Woll-James W. Gerard Plan for National Civic Federation</b>	"Business Congress" of all existing industrial organizations, in continuous session. No limitations or restrictions; full and complete power, even to fix prices or combine. Ten-Year Plan.	Continuous Regulation and Review.	Amendment Required.	Unemployment insurance plans set up under cooperation of labor and industry.	Raising of average industrial wage.
<b>Prof. Charles A. Beard's Plan</b>	"National Economic Council," authorized by Congress, to co-ordinate the highly concentrated industries in finance, operation, distribution, on the basis that business is public service enterprise. "Board of Strategy and Planning" also to be used. (Technical Staff.) Each industry governed by subsidiary syndicates (each with its own planning board), including an Agricultural Syn-	Continuous Regulation.	Amendment as Required.	Use of Unemployed on housing and public project programs.	President to call special session Congress to organize Agricultural and Housing Syndicates at once.

dicade, a Marketing Syndicate for retail-wholesale government, an Export Syndicate and a Building Materials and Housing Syndicate (which will float "Freedom Bonds" for huge housing programs).

## Centrifugal Casting of Non-Ferrous Metals\*

### Centrifugal Non-Ferrous Alloy Castings

Supplies of molten non-ferrous alloys available at almost any instant of time are not so easily organized as in the case of cupola melted cast iron. As in the case of steel, this is one of the difficulties to be faced in the extensive application of the centrifugal process to non-ferrous alloys. Furthermore, the amount of work available of a repetitious character and suitable for the application of the centrifugal process is limited.

In spite of this, there are several applications of this process of an extremely valuable nature to the non-ferrous industry. The difficulty of producing various brass and bronze sleeve castings sound and free from defects is almost proverbial. The sleeve castings referred to are those used for lining paper mill rolls, hydraulic cylinders and rams, pump liners and similar items. These latter may have been produced consistently in England and America for many years. The ability to produce these castings free from pinholes and similar defects is an outstanding advantage of the centrifugal process.

Cupro-nickel shell bands have been produced on an extensive scale in America by the centrifugal process. Nickel base alloys for valve seatings are produced similarly, and the process has been adopted on an extensive scale also for the production of worm wheel blanks in phosphor bronze and aluminum bronze, and the lining of bearings with anti-friction white metals. Cored bars in bronze are produced on a commercial scale in America. Generally speaking, with the exception of gear wheel blanks, sand molds have been consistently adopted in the production of cylinders by this process. One of the reasons for this is the lack of repeat requirements. Typical examples of non-ferrous alloy castings produced by the centrifugal process are referred to specifically as follows:

**Monel Metal.** It is not generally appreciated that Monel metal can be cast very satisfactorily by the centrifugal process. Cylindrical castings for valve parts, seats and discs, cylinder and pump liners, shaft sleeves and bushings have been cast extensively in Monel metal by the centrifugal process. The castings are made from ingot Monel metal, melted in coke-fired crucible furnaces. The metal, deoxidized with magnesium, is cast into cylinders on the centrifugal casting machines. Metal molds are used and the castings possess the high degree of soundness and closeness of grain characteristic of centrifugal castings. The Brinell hardness of centrifugally cast Monel metal lies within the range of 140 to 160.

**Silicon Monel Metal.** A modified Monel metal containing silicon has given very satisfactory results when cast by the centrifugal process. This alloy is prepared by the addition of approximately 2.75 per cent of silicon to remelted Monel metal. Centrifugal castings made from this alloy are completely sound and free from defects. The microphotograph Fig. 13 is characteristic of this material. The addition of silicon increases the hardness and tensile strength of centrifugally cast Monel metal. The values obtained on two samples of centrifugally cast silicon Monel metal are set out in the following table:

Table 1. Centrifugally Cast Silicon Monel Metal

Silicon Content .....	2.75%	3.09%
Ultimate Tensile Strength .....	43.70 tons/in. <sup>2</sup>	50.03 tons/in. <sup>2</sup>
Yield Stress .....	36.90 tons/in. <sup>2</sup>	49.70 tons/in. <sup>2</sup>
Elongation .....	3.00% on 1½ in.	8.00% on 4√area
Brinell Hardness .....	207	

The remarkably high yield stress of this alloy is worthy of special note. Rings machined from centrifugal cast cylinders have been examined for internal stress. The test rings when cut showed no change in gap, indicating complete freedom from internal stress.

\* From Centrifugal Casting of Metals and Alloys by J. E. Hurst, in Metals and Alloys, October, 1931.

# New Ingot Metal Standards

## Tentative Specifications for Copper-Base Alloys in Ingot Form for Sand Castings<sup>1</sup>

THE following specifications are part of American Society for Testing Materials Designation: B-30-31 T. It is a Tentative Standard, published for the purpose of eliciting criticism and suggestions, and as such is subject to annual revision.

These specifications cover copper-base alloys in ingot form for sand castings in twenty different compositions,

<sup>1</sup>Criticisms of these tentative specifications are solicited and should be directed to D. K. Crampton, secretary of Committee B-5 on Copper and Copper Alloys, Chase Brass and Copper Company, Inc., Waterbury, Conn.

These tentative specifications are, in effect, a revision of the former Standard Specifications for Brass Ingot Metal, Graded and Ungraded, for Sand Castings (A.S.T.M. Designation: B 30-22), which specifications were discontinued in 1928.

regularly sold by the trade and arbitrarily herein given numbers 1 to 20, inclusive, to differentiate them from one another. These numbers have no other significance.

The drill used shall be thoroughly cleaned. No lubricant shall be used in the operation and the drillings shall be carefully treated with a magnet to remove any particles of steel introduced in taking the sample.

The chemical analysis shall be made in accordance with the Standard Methods of Chemical Analysis of Brass Ingots and Sand Castings (A.S.T.M. Designation: B 45) of the American Society for Testing Materials.<sup>2</sup>

<sup>2</sup>1930 Book of A.S.T.M. Standards, Part I, p. 837.

### Table I—Chemical Compositions of Copper-Base Alloys

Alloy Grade	Copper, Per Cent		Tin, Per Cent			Lead, Per Cent			Zinc, Per Cent			Phosphorus, Maximum, Per Cent	Antimony	Other Elements Maximum, Per Cent					Total Constituents, Per Cent	
	Minimum	Desired	Minimum	Desired	Maximum	Minimum	Desired	Maximum	Minimum	Desired	Maximum			Iron	Nickel	Sulphur	Aluminum <sup>1</sup>	Silicon	Other Than Cop- per, Lead, Tin, Zinc and Nickel	Other Than Cop- per, Lead, Tin, Zinc, Nickel
BRONZE ALLOYS																				
No. 1	87	89	5.5	6	6.5	1.5	2	2.5	2	3	4	0.03	0.25	0.25	0.50	0.08	none	0.05	0.50	....
No. 2	84	85	9	10	11	1.5	2	2.5	1.5	2	2.5	0.03	0.25	0.25	0.50	0.08	none	0.05	0.50	....
No. 3	84	85	7.25	8	8.75	1.5	2	2.5	3.5	4	4.5	0.03	0.25	0.25	0.50	0.08	none	0.05	0.50	....
RED BRASS ALLOYS																				
No. 4	84	85	4.5	5	5.5	4.5	5	5.5	4.5	5	5.5	0.03	0.25	0.25	0.50	0.08	none	0.05	0.50	....
No. 5	83	85	4.25	5	5.75	4.25	5	5.75	4.25	5	5.75	0.03	0.25	0.25	0.50	0.08	none	0.05	0.50	....
No. 6	82	83	6.25	7	7.75	6.25	7	7.75	2	3	...	0.03	0.25	0.25	0.50	0.08	none	0.05	0.50	....
SEMI-RED BRASS ALLOYS																				
No. 7	83	84	2.5	3	3.5	2.5	3	3.5	9	10	11	0.03	0.25	0.35	0.50	0.08	none	0.05	0.50	....
No. 8	82	83	3.25	4	4.75	5	6	7	5	7	...	0.03	0.25	0.35	0.50	0.08	none	0.05	0.50	....
No. 9	79	80	2.5	3	3.5	6.25	7	7.75	7.5	9.5	...	0.03	0.25	0.35	0.50	0.08	none	0.05	0.50	....
No. 10	77	78	2.5	3	3.5	4.25	5	5.75	11	13.5	...	0.03	0.25	0.35	0.50	0.08	none	0.05	0.50	....
YELLOW BRASS ALLOYS																				
No. 11	70	71	1	1.5	2	2	3	4	20	24	...	0.01	0.10	0.30	0.50	0.05	none	0.10	0.50	....
No. 12	67	69	0	0	1.5	2	3	4	25	27	...	0.01	0.10	0.30	0.50	0.05	none	0.10	0.50	....
No. 13	64	66	0	0	1	1	2	3	30	31	...	0.01	0.10	0.30	0.50	0.05	none	0.10	0.50	....
No. 14	60	62	0	0	1	1	2	3	30	35	...	0.01	0.10	0.30	0.50	0.05	0.50	0.10	1.00	....
HIGH LEAD ALLOYS																				
No. 15	84	85	4.25	5	5.75	8	9	10	0.5	1	2	0.01	0.25	0.25	0.50	0.08	none	0.03	....	0.50
No. 16	79	80	9	10	11	9	10	11	...	...	0.25	0.05 <sup>2</sup>	0.50	0.25	0.25	0.08	none	0.03	....	0.50
No. 17	76	77	9	10	11	9	10	11	...	0.75	1	0.01	0.50	0.25	0.50	0.08	none	0.03	....	0.50
No. 18	72	73	7	8	9	13.5	15	16.5	1	1.5	2	0.05	1.00	0.25	0.50	0.08	none	0.03	....	0.50
No. 19	71	71.5	3.5	4.5	5.5	14	17	20	2	4	6	0.05	1.00	0.25	0.50	0.08	none	0.03	....	0.50
No. 20	70	70.5	5.25	6	6.75	18	20	22	0.5	1	1.5	0.05	1.00	0.25	0.50	0.08	none	0.03	....	0.50

<sup>1</sup>The term "none" as applied to aluminum allowance is defined as a maximum of 0.005 per cent when determined in accordance with Section 5.

<sup>2</sup>Minimum.



## Appendix

The data in the following tables do not constitute a part of these specifications. They are given merely to indicate to the purchaser the approximate physical properties of the various alloys specified, that may be expected of carefully

manufactured alloys of the formulas indicated and to constitute a guide to the purchaser in selecting the alloy grade best suited for meeting the service conditions for which the ingot metal is to be used.

Alloy Grade	Tensile Strength, <sup>a</sup> Lb. Per Sq. In.	Elongation in 2 in., Per Cent	Reduction of Area, Per Cent	Compression Deformation Limit, <sup>b</sup> Lb. Per Sq. In.	Brinell Hardness (500 Kg. for 30 Seconds)	Pattern Maker's Allowance for Shrinkage, In. Per Ft.	Weight, Lb. Per Cu. Ft.
BRONZE ALLOYS							
No. 1.....	30,000 to 40,000	15 to 30	15 to 30	.....	44 to 48	0.1875	535
No. 2.....	32,000 to 38,000	15 to 20	15 to 20	.....	55 to 65	0.1875	535
No. 3.....	30,000 to 36,000	25 to 30	25 to 30	.....	55 to 65	0.1875	535
RED BRASS ALLOYS							
No. 4.....	27,000 to 33,000	15 to 20	15 to 20	.....	50 to 60	0.1875	535
No. 5.....	27,000 to 33,000	15 to 20	15 to 20	.....	50 to 60	0.1875	535
No. 6.....	26,000 to 32,000	13 to 19	14 to 21	.....	50 to 60	0.1875	540
SEMI-RED BRASS ALLOYS							
No. 7.....	31,000 to 37,000	25 to 35	20 to 30	.....	50 to 60	0.1875	535
No. 8.....	29,000 to 35,000	25 to 35	20 to 30	.....	40 to 50	0.1875	535
No. 9.....	22,000 to 28,000	10 to 15	10 to 15	.....	50 to 55	0.1875	540
No. 10.....	25,000 to 30,000	15 to 25	20 to 25	.....	45 to 55	0.1875	540
YELLOW BRASS ALLOYS							
No. 11.....	30,000 to 35,000	35 to 45	25 to 35	.....	40 to 50	0.1875	535
No. 12.....	30,000 to 35,000	25 to 35	20 to 30	.....	40 to 50	0.1875	535
No. 13.....	30,000 to 35,000	25 to 35	20 to 30	.....	40 to 50	0.1875	533
No. 14.....	30,000 to 45,000	15 to 25	20 to 30	.....	40 to 50	0.250	500
HIGH LEAD ALLOYS							
No. 15.....	25,000 to 31,000	8 to 13	7 to 13	12,000	45 to 55	0.1875	540
No. 16.....	27,000 to 33,000	7 to 12	8 to 13	12,500	47 to 52	0.1875	553
No. 17.....	27,000 to 33,000	7 to 10	7 to 12	12,500	47 to 52	0.1875	553
No. 18.....	25,000 to 30,000	11 to 17	10 to 16	12,000	45 to 50	0.1875	570
No. 19.....	25,000 to 30,000	10 to 15	7 to 13	12,000	47 to 52	0.1875	570
No. 20.....	22,000 to 27,000	10 to 16	7 to 13	11,000	42 to 47	0.1875	570

<sup>a</sup> The tension tests were made on test specimens taken from ingots, except Alloys Nos. 7 and 15, which were sand cast. Sand-cast test specimens would show somewhat lower values.

<sup>b</sup> The compression tests were made on machined test specimens (sand castings) of 1 sq. in. sectional area, 1 in. high. The compression deformation limit is taken as the load producing a compression in the specimen of 0.001 in. At the request of Committee B-2 on Non-Ferrous Metals and Alloys, Committee E-1 on Methods of Testing is giving consideration to revising the dimensions of compression test specimens and the method of determining the so-called "compression deformation limit." The revision of the values in this column, on the basis of cylindrical specimens 1 sq. in. in sectional area and 3 in. high is contemplated. A revision of the methods of determining compression deformation limit is also under consideration.

Alloy Grade	Examples of Use	Foundry Manipulation	Characteristics
BRONZE ALLOYS			
No. 1	For valves and fittings for steam, gas, etc.....	Requires careful foundry practice	Machines well
No. 2	Commercial bronze for high-duty bearings where wear resistance is essential .....	Requires careful foundry practice	Machines well
No. 3	Good-strength hard bronze for general service.....	Requires careful foundry practice	Machines well
RED BRASS ALLOYS			
No. 4	High-grade red brass for general service.....	Foundry practice not difficult	Machines well
No. 5	Second-grade red brass for general service.....	Foundry practice not difficult	Machines well
No. 6	Auto fittings, carburetor parts.....	Foundry practice not difficult	Machines well
SEMI-RED BRASS ALLOYS			
No. 7	Catenary fittings, overhead fittings Electric Railways; very resistant to atmospheric corrosion .....	Foundry practice not difficult	Machines well
No. 8	Reddish yellow alloy for air, gas and water fittings.....	Foundry practice not difficult	Machines well
No. 9	Valve fittings for low pressure.....	Foundry practice not difficult	Machines well
No. 10	Yellowish red alloy for air, gas and water fittings.....	Foundry practice not difficult	Machines well
YELLOW BRASS ALLOYS			
No. 11	Yellowish red alloy for plumbers' fittings.....	Foundry practice not difficult	Machines well
No. 12	Yellow brass for light castings and ornamental work not requiring strength or subjected to internal pressure .....	Foundry practice not difficult	Machines well
No. 13	Yellow brass for heavier castings.....	Foundry practice not difficult	Machines well
No. 14	Plumbers' flanges, scupper pipes, etc.....	Very difficult. Aluminum up to 0.30 per cent improves casting properties, but increases shrinkage	Hard to machine. Not suitable for bearings or water pressure fittings
HIGH LEAD ALLOYS			
No. 15	Small bearings such as automobile bearings and bushings, machined by broaching .....	Foundry practice not difficult	Machines easily
No. 16	Bearings for heavy pressure. Not machined by broaching.....	Foundry practice not difficult	Machines easily
No. 17	Hard bearing metal for small bushings, to be machined by broaching, harder than No. 15.....	Foundry practice not difficult	Machines easily
No. 18	Locomotive engine castings and general service bearings for moderate pressure .....	Foundry practice not difficult	Machines easily
No. 19	Car journal bearings and similar service.....	Foundry practice not difficult	Machines easily
No. 20	Bearings operated at high speed and under light or medium pressure.	Foundry practice not difficult	Machines easily

# Smelting Secondary Aluminum and Aluminum Alloys

By DR. ROBERT J. ANDERSON,

Consulting Metallurgical Engineer, Cleveland, Ohio

## A Series of Articles on the Reclamation of All Forms of Scrap and Used Aluminum and Aluminum Alloys. Part 12 —Recoveries Secured in Practice on Different Kinds of Scrap\*

AS has been mentioned, the actual recoveries obtained in practice when running the different kinds of aluminum and aluminum-alloy scraps vary depending upon several factors.

The free metal in drosses from ordinary melting operations may be 30 to 50 per cent, although rich skimmings may contain 90 per cent and lean drosses only 10 per cent. Some actual recovery figures on fair grade drosses show 24 to 45 per cent of metal recovered (based on the total weight handled), when metallics arising from crushing and screening were smelted. In the pre-treatment of average dross, the crushing and screening operations may yield 50 per cent metallics, 30 to 35 per cent fines (mainly aluminum oxide), with a dusting loss of 15 to 20 per cent. In re-melting the metallics the recovery may run 70 to 80 per cent, equivalent to yields of 35 to 40 per cent of the total weight of the dross handled.

Carload shipments of the same kinds of drosses as run by four smelters gave the recoveries shown in Table 1.

The recoveries given are based on the total weights of the materials handled.

While it is preferable to re-melt oily borings only after pre-treatment, in some plants such scrap may be furnace without drying if the content of volatile matter is not excessive. One objection to re-melting oily or wet borings without pre-treatment is that the yields are likely to be very variable. Recoveries on dirty oil-soaked borings may run 50 to 70 per cent (based on the total weight), the variation in part depending on the content of volatile matter and dirt. Recoveries on the same borings after pre-treatment may exceed 90 per cent on the dry basis. Thus, taking a comparative run on two large lots of borings from a carload shipment which contained about 24 per cent volatile matter (water and oil); the yield on the borings furnace without drying, was 46 per cent based on the total weight, or about 61 per cent based on the metal content. The yield on the same borings after proper pre-treatment was 68 per cent based on the wet weight (the total weight handled to the pre-treatment operation), or about 90 per cent on the dry basis. Recoveries in excess of 85 per cent are obtained for dry borings or for wet borings after drying. Two runs on oily borings containing about 12 per cent volatile matter gave 72 per cent recovery when run without pre-treatment and 88 per cent recovery when first dried, both

calculated on the dry basis. Allowance for the heel used in the two cases above cited was made in the calculations.

The recoveries secured on castings scrap vary from about 78 to as high as 96 per cent, the variation depending upon the amount of grease, dirt, and other foreign matter present. Runs on twelve large lots of cleaned crankcase scrap gave an average recovery of 91 per cent. Five runs on large lots of miscellaneous castings gave an

TABLE 1

Recoveries reported by four smelters on carload shipments of the same kinds of drosses.

Type of dross	Recoveries, per cent				Average
	Smelter A	Smelter B	Smelter C	Smelter D	
Dross from casting alloy <sup>1</sup> ..	36	33	35	36	35
Dross from 99% metal <sup>1</sup> ..	45	38	40	43	41+
Dross from rolling alloy <sup>1</sup> ..	36	32	33	36	34+
Metallics, <sup>2</sup> screened .....	72	70	69	74	71+
Metallics, <sup>3</sup> not screened ..	64	61	60	63	62

<sup>1</sup>Metallics from different crushing and screening operations smelted.

<sup>2</sup>Oversize from Steinlein separator screened on 8-mesh riddle.

<sup>3</sup>Oversize from Steinlein separator.

average recovery of 83 per cent. The average recovery on ten lots of old pistons was 89 per cent.

Yields in re-melting painted sheet may vary from 81 to 87 per cent, and the average for nine large lots was 84 per cent. The recovery in running down old sheet and utensils may vary from 83 to 96 per cent, the indicated average for clean utensils baled being around 90 per cent. Recoveries in re-melting old sheet in the loose condition may be expected to average possibly 3 per cent less than when baled. Clean new clippings, particularly when baled, yield satisfactory recoveries, up to 97 per cent. The average recovery in running ten large lots of baled aluminum new clippings covered with a slight oil film was 94 per cent, while an average yield of 95 per cent was obtained from four lots of duralumin clippings. Yields on lacquered clippings range from 75 to 85 per cent.

An average of three runs on one-ton lots of dry grindings (with admixed alundum particles) was 35 per cent of the total weight of grindings charged. Clean foil scrap puddled into a heel has given recoveries of 80 to 87 per cent, when run in small lots.

Table 2 gives the ranges of recoveries and indicated averages for various kinds of aluminum or aluminum-alloy scraps.

\* Parts 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11 were published in our issues of January, 1925; September, 1925; February, 1926; May, 1926; November, 1926; July, 1927; November, 1927; August, 1928; October, 1929; November, 1930; December, 1930, and November, 1931, respectively.

## Summary

In this article, the question of metal recovery (yield) in re-melting various kinds of aluminum and aluminum-alloy scraps and wastes has been discussed. It has been pointed out that recovery is dependent upon the kind and character of the scrap, and that for a given grade of scrap the yield depends upon the pre-treatment, furnacing methods, and skill in handling. The usual recoveries obtained in re-melting have been indicated, and the several factors affecting recoveries of the different kinds of scraps have been discussed.

In the thirteenth article in this series, costs of producing secondary aluminum will be taken up.

TABLE 2

Range of recoveries and indicated averages in re-melting various kinds of aluminum and aluminum-alloy scraps<sup>a</sup>

Item	Recovery, per cent	
	Range	Average
Crankcases, dirty .....	80-86	83
Crankcases, cleaned .....	85-95	91
New clippings .....	88-97	94
Old sheet; utensils.....	83-96	88
Painted sheet .....	81-87	84
Ordinary dross .....	30-40 <sup>a</sup>	35
Borings .....	40-90 <sup>a</sup>	—

<sup>a</sup>Based on the original weight. It is, of course, understood that the above figures are merely comparative and should not be taken as representing any particular lot of scrap.

## Conference on Metals and Alloys

**F**OUR hundred executives and engineers listened while some of the most eminent metallurgists in the United States held discussions on metals and alloys at the first of a series of three industrial conferences scheduled at the Case School of Applied Science for the year 1931-1932. The meeting was jointly sponsored by the Cleveland Engineering Society and Case College on the latter's campus in Cleveland, Ohio, November 18-20, 1931.

The program included the following papers on non-ferrous metals.

**Metallurgy of Alloying** by A. A. Bates, Professor, Case School of Applied Science.

**Monel Metal and Nickel Alloys** by T. H. Wicken-den, International Nickel Company.

**Brass, Bronze and Copper Alloys** by W. R. Hibbard, American Brass Company.

**Magnesium Alloys** by L. B. Grant, Dow Chemical Company.

**The Romance of Metals and Alloys** by Zay Jeffries, consulting metallurgical engineer.

**Zinc and Its Alloys** by W. M. Pierce, New Jersey Zinc Company.

**Aluminum and Its Alloys** by L. W. Kempf, Aluminum Company of America.

**Review of Chicago Symposium on Properties of Metals at High Temperatures** by H. J. French, chairman Joint Committee, A. S. M. E.—A. S. T. M.

**Use of Metals at High Temperatures** by H. A. DeFries, Associated Alloy Steel Company.

**Alloys in Modern Buildings** by G. Maguolo, Cross and Cross, architects, New York City.

**Architectural Metals** by I. R. Disboro, W. S. Tyler Company.

**Alloys in Machine Tools** by D. M. Gurney, Warner and Swasey Company.

**Properties of Alloys under Dynamic Stress** by G. S. von Heydekampf, Baldwin-Southwark Corporation.

**Bearing Metals** by C. H. Bierbaum, Lumen Bearing Company.

**Alloys in Aircraft Engines** by R. R. Moore, consulting metallurgist.

**Light Alloys in Aircraft** by H. W. Gillett, Battelle Memorial Institute.

### Demonstrations and Exhibits

A number of special demonstrations were held each day from 3:00 to 5:00 P. M. These included the welding of aluminum by gas and electricity; the welding of stellite, and the welding of nickel. The exhibits included Monel metal and nickel products, aluminum products, magnesium products, stellite and hard alloys, and architectural items and art finishes.

Demonstrations were given also of stereoscopic views of radiographs of castings and also X-ray studies of the effect of cold work upon metals. Another demonstration of special interest to non-ferrous metals was a complete set-up of die casting equipment, operations and products. Physical testing machines of a wide variety of types were shown.

Among the firms exhibiting were:

Aluminum Company of America, Pittsburgh, Pa.  
Dow Chemical Company, Midland, Mich.  
International Nickel Company, New York.  
Haynes Stellite Company, Kokomo, Ind.  
Art Metal Construction Company, Jamestown, N. Y.  
W. S. Tyler Company, Cleveland, Ohio.  
Superior Die Casting Company, Cleveland, Ohio.  
Baldwin-Southwark Corporation, Philadelphia, Pa.  
Bausch and Lomb Company, Rochester, N. Y.  
New Jersey Zinc Company, New York.

### Molybdenum Plating

**Q.**—We would greatly appreciate obtaining a formula and also the method of operating a molybdenum plating bath.

**A.**—The electrodeposition of molybdenum as a metal is not at present an actual accomplishment. It belongs to that group of metals which upon electrolysis in an aqueous solution travels to the anode as an oxide.

Solutions of the salts of molybdenum have been used for giving attractive colors to metal novelties. The article is used as the anode in a solution of ammonium molybdate, with a piece of platinum as the cathode. A variation of colors is obtained. The colors are not permanent and will even fade under a lacquer coating.

G. B. H.



## A Brass Foundryman's Progress

By OTTO GERLINE

Gerline Brass Foundry Company, Kalamazoo, Mich.

### How a Boy Grew Up to Be a Brass Foundryman. His Adventures, Joys and Sorrows, as Told to W. J. Reardon—Part 7\*

DEAR BILLY:—

About this time it became necessary to put on another molder and I surely thought I was to be the happy boy to get the job. The foreman, however, had something else in view for me and so I lost out for the time being at least. This nearly broke my heart, and until he told me he intended starting a brass foundry of his own, and taking me with him, I was broken-hearted. I had had no corerom experience up to this time so he turned me over to the boss core-maker. In those days we used as binders, rosin, flour, glue and stale beer. My first job was to collect stale beer. This I did, using a little kid's express wagon, and two milk cans. I would start out at six A.M., go uptown to the saloon district and empty the beer kegs, sitting on the sidewalks waiting for the brewery wagon to pick them up. In this way I got acquainted with all the bartenders in the city, and a good many of the owners as well. Some of these fellows asked me to have a little drink once in a while, and so I learned the drinking business about the same time that I learned the foundry business. Some of my "friends" claim that I learned the drinking much better. Personally, I think I learned both fairly well, and the only difference I can see between the two is—one pays and the other one doesn't.

I never learned core making thoroughly, a fact that I have always regretted. I learned enough of it to get by on common work, and that seemed to be good enough for me at that time. I have since then come to the conclusion that a good molder should first be a good coremaker, especially if he intends to become a foreman, superintendent, manager or owner. At least it will do him no harm.

About this time Mr. McConnell got his foundry started and I went to work for him. Here is where I got a lot of experience, as I was Jack-of-all-Trades, molding, core making, melting, mixing, cleaning, grinding, dipping and in fact everything that is done in a small jobbing foundry. The day's work in those days was not so hard as it became later on in my career. For instance, two heats was a day's work, tending your own furnace, of course. If we could pour twelve molds to a heat, why twenty-four molds was the day's work. In case we could pour only eight molds to the pot, why sixteen molds would be the day's work. We used number sixty crucibles only. Later he put on a furnace tender and three heats became a day's work. Please compare this with two hundred or more molds per day per man on a molding machine today.

Mr. McConnell bought a squeezer and tried to install it. Well, we all quit because as we told him we were all good Knights of Labor and would not work a molding machine. Believe it or not, we won out, for the time being at least. Later on when he was not so busy he fired all of us and put the old squeezer to work anyway, and we, of

course, were out of work. As we were simply fired and were not on strike the K. of L. paid us no strike benefit.

I was one of the boys out of a job, so I decided to go "on the road." Another molder, a coremaker and myself jumped a Nickel Plate freight and started for Cleveland, Ohio. We got as far as Girard, Pa., when a brakeman came along and asked us where we were going. We told him Cleveland, and he said if we would give him fifty cents apiece he would take us to Cleveland, and if not he would throw us off at the next stop. Not so good. Well, my two Pals decided that they would go back to Ma. As I had no Ma to go to I got on again in another car, and of course, finally landed in Cleveland with my fifty cents which that brakeman did not get. My finances were very low at the time, so I slept in the roundhouse that night and washed up in Lake Erie next morning, and after a cup of coffee started out to look for a job. I had very good luck and I got a job with the Gordon Lamp Works. I came to work in the morning and the foreman handed me a riddle full of patterns, all fancy scroll work. I believe to this day that that man knew I had a lot to learn and made up his mind to take some of the conceit out of me; and I am here to tell you he did. They were all loose patterns and I didn't even know how to lay out "the side" as we call it. He stood back in the foundry and watched me while I watched him from the corner of my eye, hoping he would leave so I could take my coat and sneak out.

After a while he came over to me and said, "You have never worked on chandelier work have you?" I said, "No, Sir." He said, "I thought so." He then said, "You seem to be very young to be on the road, and if you don't mind, let me give you a little advice. The next time you ask for a job in a foundry, tell the man exactly what you can do, and don't tell him that you can mold anything that comes along. That's a big order, and very few of us can fill it. I have a straight gated job here for you I think you can make and if you can, you can have the job. At the same time you can watch the other boys and learn to make chandelier, and also reverse work. I will pay you one dollar twenty-five cents per day, until such time that you can do a better class of work, when I will raise your pay accordingly. If that is satisfactory you may go ahead." I assured him that it was and so I worked there several weeks, in fact until he had no more work for me to do. I did not learn to make chandelier work there, but I got some idea of it. Another thing I learned was that I never went into a shop thereafter and told the foreman that "I could mold anything that came along."

Next, I got a job at what was then the Central Brass Works. Here I was more at home as they made valves and plumbers' supplies, such as we made at the Keystone Brass Works in Erie, Pa. There was only this difference—sixty molds was a day's work instead of thirty, and believe me I did some tall pounding sand for a few weeks.

\*Parts 1 to 6 were published in our issues of July, 1929; November, 1929; May, 1930; August, 1930; February, 1931, and September, 1931.

I next left Cleveland and went to Pittsburgh. I got a job there at the Alleghany Brass & Bronze Works. This was with the understanding "if I could do the work." I said I would try. He brought me a pattern for a copper tuyere for a rolling mill. It was the biggest pattern I had seen up to that time. It honestly scared me. I took one good look at it, and when the foreman wasn't looking I sneaked out of the back door, and took a train for Cincinnati, Ohio. Here I went into Lunkenheimers and asked for a job, and I almost had it when the fellow happened to think of something that ruined my chances. He said, "Do you belong to the Knights of Labor?" Proudly I said, "You bet I do," and his next remark gave me a real surprise. He said, "Get to Hell out of here, and don't come in here again." It seems they had had some trouble with the boys about that time, of which I was unaware.

Here I left the brass foundry business for a while and got a job with the Cincinnati Iron & Steel Company, who were then located at Riverside, Ohio. I got a job hauling big steel slabs of boiler plate steel to the heating furnaces. Believe me, Billy, this was "some job," and I don't mean maybe. Remember, I was only a kid, and these things were heavy. In fact so heavy that I had to go to the boss and admit I could not handle the job. He said, "I didn't think you could. I just wanted to see whether you wanted to work or not. I will give you a lighter job," and so he did. I was put on cleaning the heaters' furnaces, and getting them ready for the next shift, (This had to be done between shifts). And believe it or not, you had no time to let any grass grow under your feet in the meantime. Next I caught off a sheet mill, and then off the mugg rolls. On this job I was all right for the first layer, which was on a cold floor. The next layer did not work so well for me, as this layer had to be run out on top of the first layer, and, of course, you had to walk over these hot bars. As I had none of the regulation rolling mill shoes, with heavy clodhopper nails in the soles, this was such an interesting job I went to the foreman and told him I would have to quit. He was a good old scout and loaned me a pair of his shoes, so I could hold my job.

The next job he gave me ruined me. This job was helping the heater on a boiler plate mill. The process here was as follows: With a heavy fork swinging on an overhead trolley system you would go up to the furnace, put a handful of sharp sand on this fork, (to keep the hot slab from sticking tight), pick up a hot slab and bring it over to the rolls and dump it a certain way so that the rolls would pick it up on an angle, or in other words on a corner. These rolls were set for about a one and one-half inch squeeze. The hot slab, as I remember it, was about two and one-half inches thick. The steel fork for handling them was about six inches up and down, and about two inches through at the place it was hooked up with the ring and chain to the trolley above. I call your attention to this so that you can figure out for yourself what happened when I get through telling you. Well, here it is. I was singing away at my work, happy as a lark, because next day was pay day, and as they paid every two weeks I was a little shy of cash. I went over to get my next slab of steel, and alas, I forgot to put sand on the fork. When I got to the roll and turned the fork, the slab didn't let go, and before I knew what it was all about the rolls had caught the steel slab and took the fork with it. The swing of it threw me outdoors (the mill was open) and then things happened fast. The safety springs went out through the roof, all the gears on the sides of the rolls were stripped, the governor belt ran off, and the big engine started to run wild. No one could see a thing for dust, everybody was hollering. Everybody was excited, and in the excitement I got away and ran all the way into Cincinnati, along the old river, scared to death. I left

behind me my clothes, my hard earned two weeks' pay and my little girl friend, never to see any of them again. I never went after my pay, and as these people are out of business now, (and I will get two dollars for writing about it) I am willing to call it square, and I hope that they are too, in case one of their old-timers sees this. I don't know how much damage I did at the time. I had no time to inquire, and no desire to. I took a freight for St. Louis the same night, and so ended my rolling mill career.

I might have made a good puddler, heater, or roller, and perhaps I would have had a place like Charlie Schwab. You never can tell, can you? That twenty-four dollars I left with them about forty-four years ago should amount to a nice little piece of money by this time, including compounded interest, shouldn't it? If anyone with authority should read this, and thinks I am entitled to it, don't forget to give him my address, Billy. I'll split with you.

My trip to St. Louis was no picnic. I was only a few miles out of Cincinnati when the head brakeman came along and collected a half dollar, giving me my choice of either paying it or unload. This bird then put the middleman next to me and so he collected another half. Next the three brakemen came on together and told me that unless I gave them another half I would have to get off the train. So I parted with another half, and they put me in another car, telling me that this car would go on to St. Louis, and no one else would bother me. I believed them. I got out some old newspapers, spread them out on the floor of the car and went to sleep. I awoke some time in the morning and found my car standing still. I opened the side door and took a look around. Well, "my car" was standing on a sidetrack about forty miles out, alongside a sawmill, and about six miles from the main track. They must have thought this a clever trick, but I didn't.

I got to East St. Louis all right, but broke. It cost a nickel to cross the bridge, but I didn't have a nickel. A teamster came along and told me to climb in his empty coal wagon, which I did, and we started for the toll house. Would you believe it, the first thing that fellow did was to look into this wagon, and, of course, I did not get over the bridge that time. After a while I got a "bright" idea. I would duck under his window and run. Some idea, but it didn't work out so good. I got over all right, but I did not figure on the telephone, so it happened that I ran right into the arms of a big policeman, who fanned my north end to the center of the bridge, and told me not to try that stunt again. I then started begging for a nickel, but had no luck. In fact I ran into another cop and had to do some real begging to keep out of jail.

I next tackled a ferry-boat. They told me I could ride over with them, provided I would shovel some coal from the storage bins to the firemen. I shoveled a lot of coal for these fellows, as they made me make two trips before they let me off. I was as black as a coon when I landed, and some kind-hearted barber let me take a bath in his place for sweeping out and cleaning all the brass cuspidors.

Well, anyway, I was in St. Louis, where I had some distant relations that I had never seen. They happened to live in Corondelet, out on the south side, and I started to walk out there. I arrived about midnight, and found a little log cabin big enough to hold about two people, and also found there were about seven of them living in it. It further turned out that this guy had no use for my Dad, while he was alive, and seemed to have a darn sight less use for me. And here I was, eight to ten miles out of St. Louis, after midnight, tired, hungry, and no place to go, and broke. So I walked back to St. Louis, hunted up a box car and slept better than I do in a good bed now.

Next day I got a job with W. H. Garrett & Company, Brass and Bell Founders.

(This series will be continued in an early issue.—Ed.)



# Barrel Rolling and Plating

By R. J. O'CONNOR

Contract Plating Company, Bridgeport, Conn.

## The Practical Operations As Carried on in a Job Shop. Cut Down Rolling, Ball Rolling, Sawdust Rolling, Wet Rolling, and the Solutions for Barrel Plating

FROM THE MONTHLY REVIEW OF THE A. E. S., OCTOBER, 1931.

**I**N the past ten years, there has been a very great improvement in the plating of small parts. It was not long ago when it was common practice to color buff and basket plate almost everything of this nature, where a passable finish was required.

At the present time, very good results are obtained by the various types of rolling, from common pins, sheet metal pieces up to 12" in length in all shapes—to malleable and grey iron and brass castings weighing one pound each. It is the intention of this paper to try to outline the best methods of rolling and plating to obtain the best results.

### Cut Down Rolling

For a high and smooth finish on castings, a horizontal barrel has been found to be the most satisfactory. It is customary to use slugs or balls to help in the cutting down process, and in some instances it is absolutely necessary. However, in plants where large varieties of shapes are handled, different types are mixed together—one for example that will reach the recesses of the other. Care should be taken not to mix pieces that will either nest or break the other. The work is then taken and placed with a quantity of either builders' or sea sand in the barrel, enough water is added to cover the work, and run at from 30 to 40 revolutions per minute. The length of time required for a good finish depends to some extent on the shape of the casting. However, for the general run of work the following is satisfactory: malleable iron 35 hours, grey iron 75 to 80 hours, brass and bronze 12 hours. The vents should be opened about every 5 or 6 hours. It has not been found advantageous to change the sand, as it does the heavy cutting when rough, then breaks down and performs the second operation. The castings are then freed from mud, and in the case of iron, given a light muriatic acid pickle, while the brass and bronze are bright dipped and placed in a ball barrel that has been wood lined, and rolled in balls with a mixture of soap chips and a small amount of sodium cyanide for 12 hours. The work is then removed from the balls, rinsed in hot water, and dried by rolling in sawdust, and is ready to plate.



R. J. O'CONNOR

### Ball Rolling

When work comes to the finishing department that requires ball rolling as a first operation, it must first be cleaned of grease and scale. The time for rolling depends on the nature and shape of the parts. Small pieces that roll freely without scratching can be brought up bright in about one hour by using a barrel that rotates at a high speed—say 35 revolutions per minute. On flatter and larger surfaces, the speed of the barrel must be cut down to suit the article. I have in mind a job that we were giving a one wheel operation and still plating. It was found necessary to cut down the cost of finishing, even if we had to sacrifice the quality slightly. This piece was

made out of cold rolled steel, about 10" long, 5" wide, but fortunately was turned up at both ends, and it was therefore possible to pack it in a horizontal ball barrel in such a way as to hold it stationary while in process and let the balls roll around to bring up the luster. It was then still plated and again ball rolled. In this way scratching was cut to a minimum, and a very high finish produced. Chip soap is the most commonly used material in the above process, although in some cases a small amount of cyanide is added in addition.

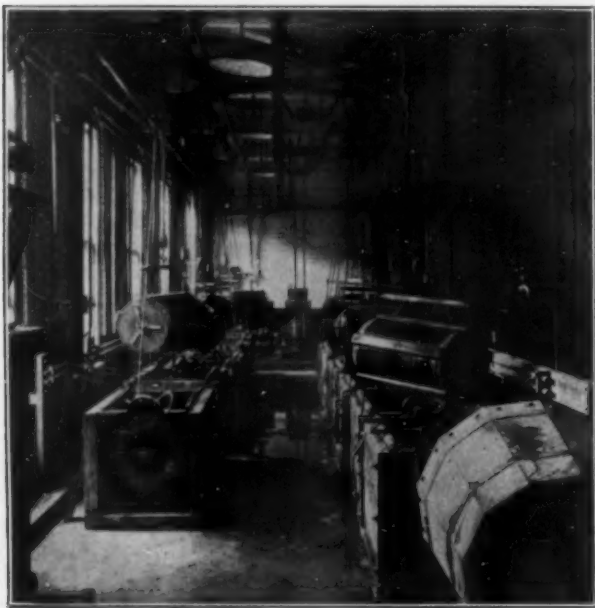
### Sawdust Rolling

Very good results can be obtained by sawdust rolling in an oblique barrel. It is advisable to use hardwood sawdust. Here the material can be taken just as it comes from the press. If the work contains too much oil, however, it is well to use old sawdust for a preliminary rolling—that is, the work is first taken and rolled for about 15 minutes in sawdust which is kept in a separate box and used only for the purpose of removing grease. This is sieved out at the end of the above time and put back in the same barrel and covered with clean sawdust. The length of time given this material at this stage depends on the nature of the work. For example, machine screws can be brought up to a very high finish in about 1½ to 2 hours without any danger of spoiling the threads, taking care to use enough sawdust so that the screws will not



roll too much on each other or on the outside of the mass. This also applies to wood screws. A very fine sawdust should be used for this purpose so that the kernels will not clog the threads or slots. This method also applies to all machine screw products, and has been found to have a distinct advantage over wet rolling, in that it gives a much higher color in the same length of time, with less danger of ruining the finely machined parts. Also, on many other wire parts and a great many of the smaller sheet metal

This applies to tubular rivets, safety pins, eyelets and the like. The length of time required here again depends on the finish wanted, shape of pieces, etc. We process quite a variety of work in this way and find after using soap, soap bark, cream of tartar in various combinations, that on material that has to be tumbled for a short time, these work out very well; on pieces that have to run say 6 to 8 hours, it is not so satisfactory, as it is necessary to change the water every hour or so. We have therefore adopted the potash and cyanide mixture and can run work in open barrels for about 8 hours without changing. On some types of work, good results can be obtained by running in a horizontal barrel with any of the above mixtures and adding some clean hardwood sawdust. This works out very well, but its use is limited.



Barrel Plating Department

pieces, the dry sawdust method is found simpler, more economical, and better than the wet method.

#### Wet Method

The term "wet rolling" as most of us understand it means rolling in an oblique barrel, using potash, sal soda, sodium cyanide, soap, soap bark, cream of tartar or a combination of some of the above with enough water to cover the work where the material is of such a nature as to burnish on itself, so that it is not necessary to use balls.

#### Barrel Plating

Very rapid progress has also been made on the method of plating small parts automatically or by the barrel process. The large Jumbo type with wood or canvas panels has given way to the smaller and more efficient plating unit—size 30 x 15 barrel. Celluloid or Bakelite is the most commonly used paneling, the latter predominating, as celluloid can be used only in nickel plating practice. With the proper cathode contacts it is no longer necessary to use 12 volts, as 6 volts gives a deposit that is satisfactory in both thickness and appearance. The length of running time depends on the type of solution being operated.

#### Plating Solutions

There is a wide difference of opinion as to the ideal solution from a standpoint of composition. I can only give the formulas that have been found satisfactory by myself and others in New England who systematically analyze their solutions and who process a large amount of work by the above method.

#### NICKEL

4 oz. nickel per gal.  
pH—5.8 to 6.0.  
3 oz. chloride per gal.  
2 oz. boric acid per gal.

#### BRASS

2 oz. copper per gal.  
.75 oz. zinc per gal.  
1 oz. free cyanide per gal.

In some places, they have found it impossible to use this mixture where they are plating hardened parts,

Ball  
Rolling  
Department



springs and the like. They have to cut down very materially on their cyanide; the solution running  $1\frac{1}{2}$  to 2 ounces of free cyanide embrittles that type of work. So by sacrificing their metal concentration and with free cyanide much lower, it is possible to get fairly good results, but not quite as good with this mixture. In other words, this is good for all general lines of work and has few exceptions.

#### COPPER

2 oz. copper per gal.  
1 oz. free cyanide per gal.

Copper solutions are run hot in a barrel about 120° F. and they work out very well with two ounces of copper per gallon and one ounce of free sodium cyanide. No brightener is used in any of these solutions at all.

#### CADMIUM

2 to 4 oz. cadmium per gal.  
2 to 4 oz. free cyanide per gal.  
1 to 2 oz. total alkali per gal.

Cadmium, again, seems to work better; in fact, we have run it where we have only had two ounces of cadmium per gallon. We have got very good results by running our cyanide up as high as four ounces per gallon. However, on some parts this was rather dangerous, as it had a tendency to blister. If you keep right in the range of 2 to 3 ounces of cyanide, where you have two ounces of cadmium, you will get very bright deposits.

When we started our cadmium solutions, we made additions of Postum for brightener, but we get fairly bright deposits now, without making any brightener additions at all, as long as we keep our cadmium down and our cyanide fairly high.

We ran into a peculiar thing in the plating of malleable iron castings in a cadmium bath. We plate a great many castings just as they come from the foundry or sand blast, and never have any trouble with peeling. We can run our solutions very high in cyanide. But where we cut down and roll some of these malleable iron castings we experience a lot of difficulty with blistering. The only thing we have done to eliminate that is to cut our cyanide content way down; but at the best we still have quite a little difficulty with these malleable iron pieces that have been cut down and then cadmium plated. Some batches of work, whether it is the fault of the foundry or something, I don't know, seem to plate all right. We experience very little trouble with peeling, and run along for about a week, and then the next week we will probably have one day or one batch of castings that will peel very badly and blister.

I haven't gone into zinc very thoroughly, although we operate some zinc barrel solutions, about six. We try to keep our metallic zinc at about four ounces. We add some aluminum sulphate, about two ounces to the gallon, and find very good results where we add about as much chloride as we can safely get in the solution. We use sodium chloride, and at the present time we are running about eight ounces of sodium chloride per gallon in our sulphate of zinc and getting very good results. Here, acid is also added every night to feed the solution. In the morning, if we get any free acid in, it digests itself on the anode and kills the effect, so that it is fairly neutral or slightly acid when we start in the morning. We get better results by running our acid zinc very slightly acid.

Now, regarding the handling equipment in barrel plating, we all endeavor to have overhead handling. It is surprising, however, to see the number of plants where there is still, as we call it, "buggerlugging the work around."

It is very easy to get a block and an I-beam and use all overhead handling, where possible.

Automatic sieves, too, cut down the work to a great extent, and are comparatively easy to operate. Some people, in some plants, have a blower system to put the work through. The air sucks the sawdust free from the work and puts it in a container, and then that can be tapped for fresh sawdust. That is also a very good method of handling.

#### Discussion

CHAIRMAN KENNEDY: Are there any questions?

MR. KELLEY: The speaker mentioned free cyanide in brass solutions of one and one half ounces per gallon runs into embrittlement. I wonder if the same is true in cadmium solutions, in the case of spring material.

MR. O'CONNOR: Yes. In the case of spring material for cadmium, we have to cut the cyanide down very much. We find, however, the tendency in most of these cases seems to be that where the material is hardened it also contains some scale, and as a general rule that scale is pickled off, and runs into embrittlement.

Anything that we can roll, we remove the scale by rolling in pumice, and cut down our cyanide content in our cadmium plating barrel.

MR. KELLEY: One other question. In the cleaning of copper and brass parts, you tumble those in sand. Have you had any trouble in the following plating operations getting a bright finish on them, due to the sand being imbedded in the copper parts.

MR. O'CONNOR: No, that sand rolls fairly clear. Of course, as I said, where you have recesses you can't use sand; you would have to use a pumice and roll a little longer. But, of course, that work is afterwards ball rolled that I have reference to in the sand tumbling. Probably the reason you get your sand imbedded is that the grains of sand get into the recesses of your work. If you use pumice in the place of sand, you won't have that trouble.

MR. F. E. TERRIO: What kind of sand do you use?

MR. O'CONNOR: We used to use sea sand, as we were right near the shore. But they stopped the practice of taking sand away. We then went to builders' sand, and we find no difference between sea sand and builders' sand. In fact, we rather favor the builders' sand, but on some types of work sea sand works a little better because it is a little harder at the start. Regular builders' sand that has been sieved free of pebbles works very well.

MR. W. F. FOX: May I ask how your weight of work compares with the balls used?

MR. O'CONNOR: It depends entirely on the work that it is to be done. In some work you can use an equal quantity of balls and work. Naturally that would not be very many balls, because your work is lighter than the balls. But you have to experiment to find out just how much ball you should use with your work. Where your work is flat, and has a tendency to scratch too much, then very often you have to use 2 to 1, and be very careful about the speed of your barrel. I mean you must cut down on your barrel speed where your work is inclined to scratch, and that will do away with the scratching although you may have to run a little longer.

MR. F. J. HANLON: I don't remember whether you mentioned whether you had any particular recommended speed for your barrels.

MR. O'CONNOR: No. We use all speeds for various types of work. Of course, we are job platers and have got all types of work, and you have to use the type of speed that will fit your work. Very often you will



have to experiment. You get so that you know, however, after a certain length of time, just what to do. Very often you spoil a couple lots of work before you find that out.

MR. H. H. WILLIAMS: In respect to the speed, I have done considerable of that sand burnishing work in the past, and found the speed is simply a question of having your work roll instead of throw; have it so that it will roll down on the slant. There is where you get your burnishing or cutting, and I think the most speed I use in the 18" diameter barrel is 40.

Now, another thing on the sand proposition. There is a great difference in sand and builders' sand. At first we used to get the Mississippi River sand, but we found that the sand on the Merrimac River, a smaller stream, was much sharper, and that is what we were after, because the castings we tumbled were very rough, and we found that even this difference in the sand between the two rivers made a great difference in the length of time needed for cutting down rough castings.

MR. F. E. TERRIO: Have you ever used the sand that is used for sand blasting?

MR. O'CONNOR: Yes, we have used that where, as Mr. Williams said, the castings were rough, and in the case of gray iron castings very often you can cut down your rolling time by using quartz or any of the harder silicates.

MR. THURBER: I would like to ask Mr. O'Connor one question about the device for holding larger pieces in ball rolling. You mentioned a ten-inch piece where you had some device for holding it.

MR. O'CONNOR: There are devices,—I don't know whether they are commonly used, because there is quite a little trouble to set the pieces in devices. But this particular piece I had reference to (and we process a lot of these by the same method) happened to pack into the barrel in such a way as to hold itself. It had ears on it, so that one would rest up against the other, and, of course, you had a rather white spot at that particular point, but on some work that doesn't make any difference. I had reference to just packing in the barrel, without any device, although there are devices used that will hold work stationary while in the ball-rolling process, on the larger pieces. I have never used them but I have seen them.

MR. F. F. OPLINGER: One thing in connection with this paper which I think would be interesting to have an expression of opinion on, Mr. O'Connor, is where production requirements are large, on for instance, the production of small malleable iron or gray iron castings, which

is the most economical and the most practical to use—sand blasting or barrel rolling?

MR. O'CONNOR: Well, you see, the barrel rolling we are talking about here has no relation to sand blasting. Sand blasting merely removes the sand as the castings come from the molds. We are talking about cutting down rolling. We are assuming most of these castings come from the foundry sand blasted. It is very necessary to sand blast everything that is to be rolled. Of course, in some cases, you can roll a burr off, roll the skin off the castings by the cutting down process, but there is really no relation to it here. But I think I can answer your question. It is more economical to roll in the foundry instead of sand blasting. However, it is harder to plate the material after it comes from the rolling barrel. The sand blast is the most practical, although it costs more, for plating purposes. In the case of japanning, barrel rolling is plenty good enough.

MR. W. F. FOX: Have you ever had trouble with breaking down the corners?

MR. O'CONNOR: I have found from my experience that anything that will remove the scale and bark off of your brass castings will also blunt and remove your corners.

MR. G. A. WILSON: I would like to verify a statement in regard to the sawdust. Now my work is almost exclusively screws and small articles of that kind. My experience has been that however fine you may sift your sawdust, in the smaller screws, you get grains of sawdust imbedded in the slot. In turn, you have specifications that call for a certain length of time in your salt spray, and you will find that that will break down while you are looking at it. You don't have to put it in your salt spray to see it break down. Now, we changed from that to sand, and we ran into the same difficulty. We have changed from the sand to pumice. The pumice is a little expensive, but we got off grade.

MR. O'CONNOR: Of course, here you are speaking of using pumice on machine screws before they are threaded?

MR. WILSON: These are threaded and hardened.

MR. O'CONNOR: That is a little different story, of course. What I mean is where you speak of rolling machine screws in sand you can't give them very much sand rolling without spoiling the threads, but these pieces are hardened. Yes, as Mr. Wilson says, on the smaller machine and wood screws it is impossible to get a sawdust that will not clog the threads. However, in the majority of cases, that doesn't make any difference, except where the specifications, as he says, are rigid.

## Giant British Airship Sold for Scrap

Great Britain's giant airship R-100 has recently been sold for scrap, and it is stated the breaking up will begin very shortly. Its disposal was one of the savings recommended by the British National Economy Committee a few months ago. Elton, Levy and Company, Ltd., London merchants, who made the purchase from the British Air Ministry, state that it is not yet known to what purpose the great mass of metal from the airship will be put. The metal mainly comprises aluminum and aluminum alloys. It is likely that most of it will be made into souve-

nirs, such as ash trays, etc. It is understood on the best authority that the purchase price paid for the R-100 is considerably less than £50,000. The airship cost approximately £1,000,000.

The metal wreckage of the ill-fated sister airship R-101, which crashed at Beauvais, 40 miles from Paris, about a year ago, with the loss of 48 lives, was acquired by a Sheffield firm of metal dealers to be melted down and sold for making household utensils and other metal articles. R-101 cost between £400,000 and £500,000 to build, but now the great airship has gone for a figure that is said to run into a few hundred pounds. A. EYLES.



# Layout of a Small Electro-Zincing Department

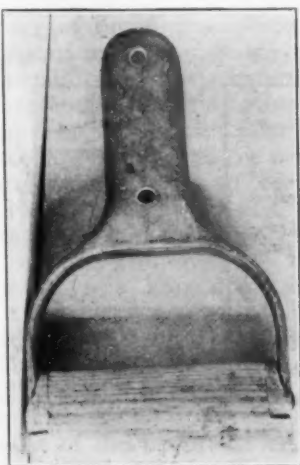
By JOHN L. EVERHART

Chemical Engineer, 473 Morris Avenue, Elizabeth, N. J.

## Arrangement of a Plant for 150 Dozen Yokes and 80 lbs. of Ferrules per Day, Operated By a Plater and One Helper

SEVERAL years ago, one of the leading manufacturers of shovels was having a great deal of trouble in obtaining galvanized (zinc-coated) handle-yokes which were satisfactory in appearance.

After a consideration of the matter, it was decided that as there were only two items requiring zinc-coating a small electro-galvanizing department could be installed and operated under the control of the plant chemist with a minimum of attention. Since the installation, this department has been operated by a plater with one helper with very satisfactory results and a noticeable improvement in the appearance of the galvanized articles over that obtained from outside sources.



Assembled Grip

### Layout

The department was divided into three connected sections which could be cut off from each other and from the rest of the building by fire doors.

### Pickling Room

The yokes were manufactured by an outside firm and as received were scaled lightly and covered with a thin layer of grease. The pickling room was laid out to pre-



Pickling Room

pare this material for galvanizing. Two vats were installed along one wall to be used for removing the grease and scale. They were heated to the operating temperature by means of steam coils. A hood was installed over the pickling tank to remove the fumes but was found to be unnecessary after a pickling compound was substituted for the ordinary acid pickle which had been used when the department was laid out originally.

Hot and cold water rinse tanks were placed near the vats for washing the material between operations, the hot water being obtained by steam heating.

Two tumbling barrels were placed in the room for removing the loosened scale and finishing the preparation of the yokes for galvanizing.

The remaining apparatus consisted of metal baskets in which the yokes were placed for cleaning and pickling, and a table to be used for sorting and counting the pieces.

### Galvanizing Room

The zinc was deposited from a cyanide solution. Two galvanizing tanks were used. The first, which was used



Galvanizing Room—Large Tank on Left, in Right Rear

for plating the yokes, was a 700 gallon capacity tank with a traveling cathode. The speed of the cathode could be controlled by means of a rheostat as the apparatus was operated by a variable-speed motor and it was arranged so that the time required for one complete cycle was sufficient to give a good coating on the material. The other was a plating barrel installation with a 70 gallon tank and was used for plating ferrules which were readily adapted to this type of operation.

Hot and cold water rinse tanks were placed near each galvanizing tank for washing the material after plating and in this department also the water in the hot water rinse tank was heated by means of steam.

A hot air dryer was placed in one corner of the room to finish the drying of the material after the galvanizing operation.

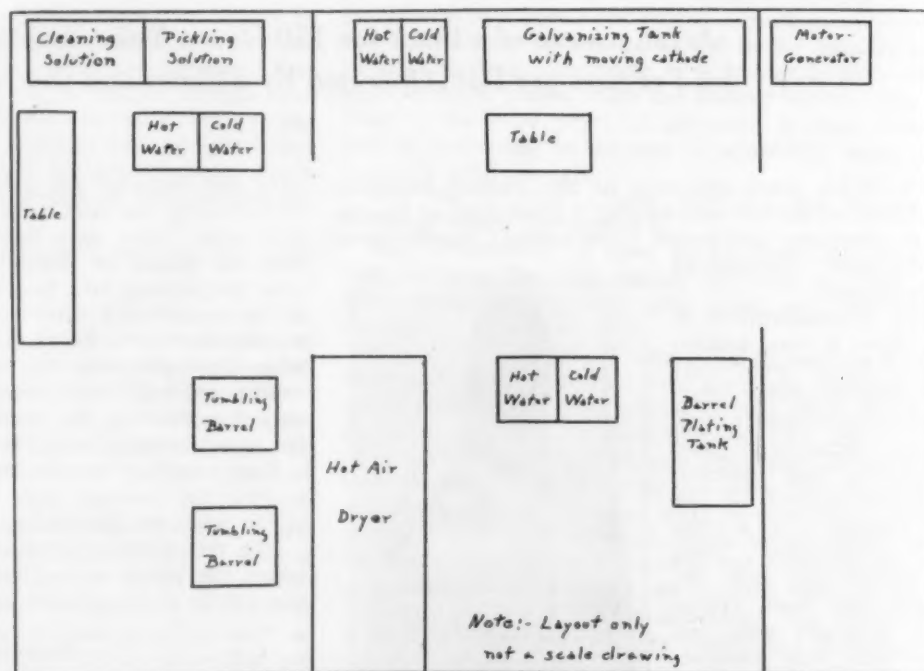
The apparatus was completed by a number of copper hooks on which the yokes were suspended for galvanizing. Each of these hooks held ten yokes and was arranged so that the yokes could be placed and removed with a minimum of time.

ration which assisted in removing the loosened scale. After tumbling for about half an hour, the yokes were washed and turned over to the plater.

The ferrules were not scaled and were prepared for galvanizing by dipping into the cleaner, washing with cold water, dipping in muriatic acid, and again washing with cold water.

For galvanizing, the plater started the motor which

Layout  
(Not to Scale)  
of Galvanizing  
Plant



The remaining wall space was used for the storage of departmental supplies.

#### Motor Room

The only apparatus placed in this room was the motor-generator set with the necessary starting and controlling switches.

The entire layout was very compact and required a minimum of walking by the plater and his assistant in the performance of their duties.

#### Operation

The operation was simplified by the fact that there were only two articles to be galvanized, the yokes, and the ferrules which were used to fasten a wood grip into the yoke.

The yokes were counted out into batches of several dozen by the helper, after which they were put into baskets and placed in the cleaning vat in which a standard metal cleaner was used. After removal of the grease by this method, the material was rinsed in water and placed in the pickling bath. After pickling for a period varying from one half to one hour depending on the scale, the yokes were washed in water and placed in the tumbling barrels in which a solution of sodium carbonate was used to neutralize the remaining acid during the tumbling operation.

After tumbling, the yokes were moved to the galvanizing tank. The plater moved the cathode and then, while standing at one end of the tank, hung hooks each of which held ten yokes, on the cathode as it moved. The batches were of such a size that by the time he had placed the last hook on the cathode, the first was back to the starting point. As the hooks reached this position, the plater removed them, dipped them into cold water, stripped off the yokes and placed them in a basket which stood in the cold water tank. As each basket was filled, the helper dipped it into the hot water rinse to assist in the drying and then spread the yokes out on screens in the dryer.

Ferrules after cleaning were placed in the plating barrel in batches of forty pounds and the barrel was run for a period of one and one half hours after which the ferrules were dipped into cold and hot water and spread out on screens in the dryer.

The output of the department averaged about 150 dozen yokes and 80 pounds of ferrules per day which was sufficient to supply the demands of the organization for grips of this type.

Very little attention was demanded of the chemist with the exception that the plating solutions were analysed once a week and the solutions were adjusted to the proper composition.

Although the department was small, it turned out good work and had the additional advantage that it was in the plant of the consumer and therefore rush jobs could be taken care of with a minimum delay.

# An Efficient Electrotinning Process

By F. F. OPLINGER

Electroplating Service Laboratories, The Roessler & Hasslacher Chemical Company, Inc., New York, N. Y.

**A Method Which Has Been Successful in Large Commercial Installations. Composition of Solutions, Preparation, Operating Conditions, Control and Maintenance Are Described in Detail**

THE extraordinary resistance of tin to atmospheric corrosion and to the attack of many organic acids has made it a useful metal for many purposes. Common steel and brass pins are coated with tin to improve their appearance, thus increasing their sales value; food containers of thin sheet steel are tinned with the result that perishable foods are conserved in an economical and sanitary manner. These are but a few of the older applications of tin plating, familiar to all. The storage of food in the electric refrigerator is made sanitary since the practice was introduced of electrotinning the copper and other metal parts used in its construction. The commercial value of this practice was quickly established. One large manufacturer uses a 20,000 gallon electro tin plating solution and practically all the others have adopted the practice.

These are but a few examples of the broad use and value of electrotinning in the ferrous and non-ferrous metals fabricating industry and this type of work still has much room for development.

## Specific Applications of Electrotinning

Food product containers of all kinds:

Electric refrigerator parts,  
Kitchen utensils,  
Cream separator parts, pasteurizing apparatus and other creamery apparatus,  
Milk cans, etc.

Copper refrigerator coils.

Copper cooling coils.

Washing machine parts.

Wash boilers.

Gas stove parts.

Radio parts.

Electrical apparatus.

Brass builders' hardware.

Copper, brass and steel wire and sheets.

All non-ferrous metal parts requiring a white finish resistant to tarnish, where extreme hardness is not essential.

## Process for Electrotinning

The electrotinning process described below has been developed in Electroplating Service Laboratories of The Roessler and Hasslacher Chemical Company, Inc. It is

based on extensive research and tests to secure the best possible results from the alkaline bath.

Applications for letters patent covering the process, composition of the bath and the methods of control, have been filed by The Roessler and Hasslacher Chemical Company, Inc.

## Historical

Until recent years, tin has been deposited mainly from acid baths containing tin salts of mineral acids. A large number of formulæ for such baths have been published in the literature. The majority have little or no commercial value in that smooth, white deposits cannot be obtained from them. Usually the deposits are dark and spongy and the baths can be operated at low current densities only.

A large number of formulæ for alkaline baths also appear in the literature. In general, these baths are open to the same objections named above.

A few baths containing complex salts such as stannous ammonium oxalate, tartrates, and pyrophosphates have been recommended.

A stannous sulfate bath patented by Mathers (U.S.P. 1,379,228-1,540,354) and now assigned to the R. & H. Chemical Company, Inc., contains:

Stannous Hydrate .....	3	oz./gal.
Sulphuric Acid .....	16	"
Cresylic Acid .....	1.3	"
Glue .....	0.5	"

and gives the best results for an acid bath.

In 1927, Oplinger and Wernlund in comparing the alkaline and acid baths discovered that in alkaline baths the character of the deposit varied quite widely depending on the alkalinity of the solution. Later it was found that the permissible alkalinity was directly proportional to the sodium stannate content of the solution. Methods of control in which oxidizing agents play an important part were evolved and the present bath was developed. So far as we are aware, it is the best tin plating solution now known and the only one from which the character of the deposit can definitely and in a simple manner be controlled by chemical analysis.

## Advantages of the Process

### Deposit:

Smooth, adherent, semi-bright deposits of any desired



thickness may be produced indefinitely without deterioration of the bath.

#### Bath Control:

The function of each ingredient of the bath is definitely known. The effect of variations in composition is known. The composition of the bath and the character of the deposits produced can be readily controlled by means of simple methods of chemical analysis.

#### Throwing Power:

For plating deeply recessed articles, the sodium stannate-acetate bath is indeed excellent. Uniform appearing deposits of smooth, white tin may be obtained over the surface of very deeply recessed articles.

#### Economy of Operation:

The bath may be operated at low cost without excessive waste caused by the formation of large quantities of sludge. Under the preferred operating conditions, it is unnecessary to use large quantities of sodium stannate for replenishing. Anode and cathode current efficiencies are closely balanced.

#### Superiority of the Sodium Stannate-Acetate Bath Over Acid Baths:

The sodium stannate-acetate bath is superior to acid baths because of the following reasons:

- (1) The deposits from acid baths are never quite as smooth and bright as may be produced from this alkaline bath.
- (2) The acid baths can in general be operated at low current densities only (8-10 A/SF). This alkaline bath may be operated at current densities up to 100 A/SF.
- (3) The color of deposits from acid baths are usually controlled by means of organic addition agents, as for

example, glue, and the need for additions of such material must be judged by the operator. Therefore, the baths are not subject to accurate chemical control. Also the presence of large quantities of organic matter may in time cause serious trouble.

- (4) Under commercial operating conditions it is difficult to clean materials sufficiently well for plating in the acid bath. The alkaline bath is good cleaner in itself.

#### Superiority of the Sodium Stannate-Acetate Bath Over Other Alkaline Baths

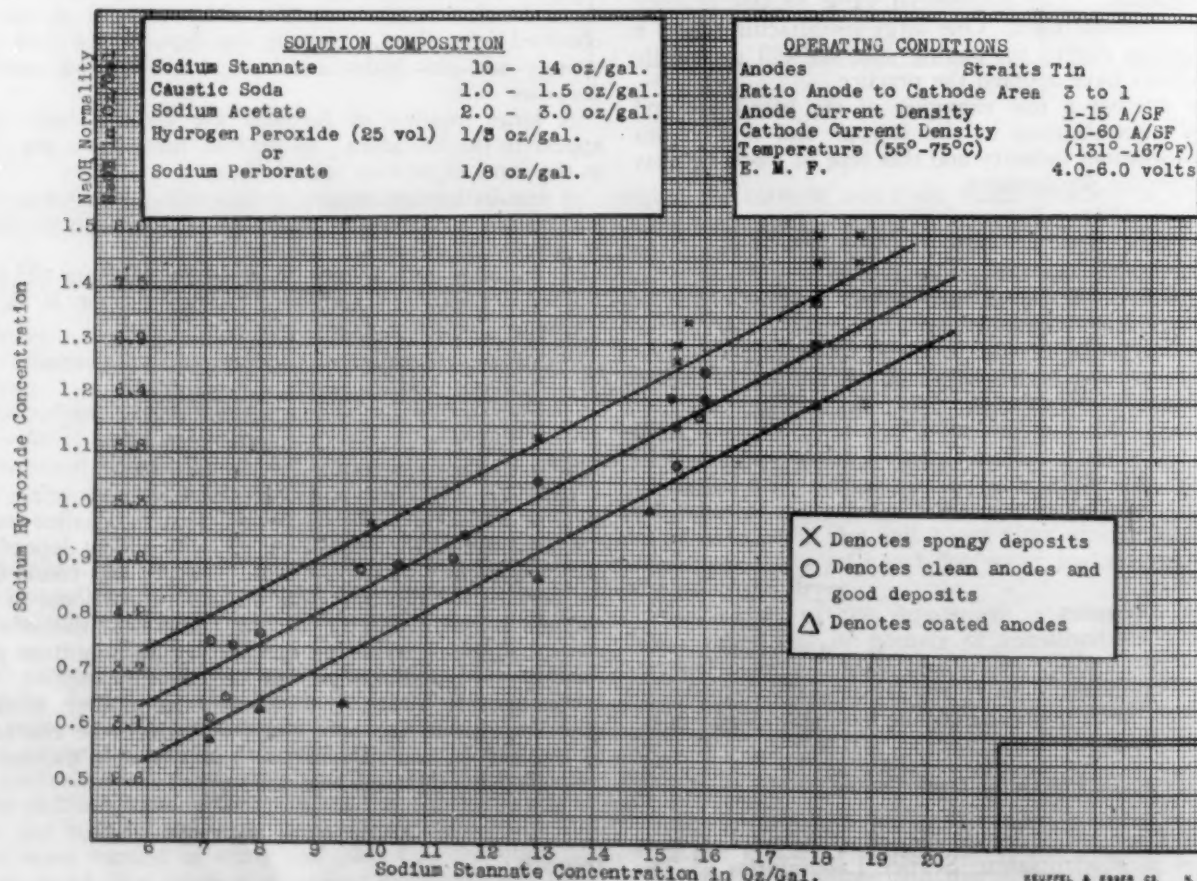
The Sodium Stannate-Acetate bath is superior to other alkaline baths because of the following reasons:

- (1) Some are uneconomical due to the formation of large quantities of insoluble tin salts in the bath and to unbalanced efficiency at the anodes and cathodes.
- (2) Fairly good deposits may be obtained for short periods of operation after which the baths deteriorate and good deposits may no longer be obtained.
- (3) Smooth, white deposits are obtained only on lightweight (time—5 to 10 min.) deposits. With longer plating time, spongy deposits are produced.

#### Solution Composition

In general, the solution composition may vary as below under Permissible Variations" and still give good results.

	PREFERRED COMPOSITION Ozs./gal.	PERMISSIBLE VARIATIONS Ozs./gal.
Sodium Stannate .....	12	8.0 to 18.0
Caustic Soda .....	1	½ to 2.0
Sodium Acetate .....	2	2.0 to 4.0
Hydrogen Peroxide (25 vol) .....	1/3	1/6 to 2/3
(25 volume) or Sodium Perborate .....	¼	¼ to ¾



### Preparation of the Plating Solution

#### Equipment:

A clean steel tank with steel or iron heating coils should be used.

#### Procedure:

Fill the tank with water to 2/3 its capacity and heat to 140-158° F. Add the required amount of sodium stannate, stirring thoroughly until all dissolved. To this add the required amount of caustic soda and when all is dissolved, add the required amount of sodium acetate. Follow by adding the sodium perborate or hydrogen peroxide. The solution is then ready for use.

#### Operating Conditions

**Anodes:** Straits tin or other anodes of equal purity may be used.

**Ratio of Anode to Cathode Area:** The anode area must always be large enough so that the anode current density is less than 20 A/SF. Anode to cathode ratio should be 2 to 1.

**Cathode Current Density:** Between 20-60 A/SF to produce excellent deposits.

**Voltage:** Between 4.0-6.0 volts for normal results.

**Temperature of Solution:** Between 140-160° F (60-70° C) for excellent results. At lower temperatures the deposits may become dull and the solution loses efficiency. Higher temperatures must not be used because of the danger of precipitating insoluble salts to the bottom of the solution.

#### Functions of the Bath Ingredients

##### Sodium Stannate:

The sodium stannate is a reservoir for the tin which is deposited at the cathode. Maximum efficiency is obtained only when the sodium stannate content is greater than 6.0-8.0 ozs. per gallon.

##### Caustic Soda:

The caustic soda acts as conducting agent and aids in anode corrosion. Without caustic soda the tin anodes insulate and fail to go into solution.

##### Sodium Acetate:

The function of the sodium acetate is quite similar to that of boric acid in a nickel solution. That is, it acts as a buffer salt and satisfactory deposits can be obtained under a wider variety of conditions with, than without, its use.

##### Hydrogen Peroxide or Sodium Perborate:

These oxidizing agents serve as a means of keeping the tin in solution in the quadrivalent form. Stannous ions are harmful in that they cause the deposition of spongy tin.

#### Control and Maintenance

##### Caustic Soda Control:

The maintenance of the proper amount of caustic soda is the most important feature of this bath. The correct figure varies with the sodium stannate content, as shown in the accompanying graph.

It will be noted that the amount of caustic soda added to the solution when it is made up does not correspond with the required amount as shown on the accompanying graph. This is because the figures in the graph have been determined analytically and when a solution pre-

pared as described above is analyzed then the figures obtained will fall within the limits shown on the graph. Sodium Stannate hydrolyzes in water solution so that when a titration for alkalinity is made, the amount determined includes that which has been added to the solution together with what is already present because of hydrolysis of the sodium stannate. The graph is very valuable in correcting and balancing the solution composition, for having determined by analysis the sodium stannate and caustic soda content of the bath, it can be referred to directly to learn whether the solution is properly balanced. Increase in sodium stannate content requires higher caustic soda content.

When the caustic soda content is too high, dark colored or spongy deposits are invariably produced. In such cases or when analysis shows that the caustic soda content is too high proceed as follows:

Dilute 1 gal. of glacial acetic acid with 10 gals. of water. Add to this mixture 1 quart of hydrogen peroxide (25 vol.) or 1 lb. of sodium perborate.

For every 100 gals. of plating solution add 1 gal. of the above prepared mixture. This addition should be made slowly with stirring and preferably when the plating solution is cold. Repeat this dose if necessary in order to produce satisfactory deposits.

This is the simplest and most economical means of reducing excess caustic. If the second addition does not work add 2 to 4 ozs. of sodium stannate to the plating solution.

##### Control of Color of Deposit:

The best results may be obtained by making additions daily or as often as seems necessary of sodium perborate or hydrogen peroxide in amounts of 1/8 to 1/4 oz./gal. This keeps all of the tin in solution in the quadrivalent form and excellent white deposits will be obtained.

Failure to obtain satisfactory results by the addition of sodium perborate or hydrogen peroxide is a sure sign that the caustic content is too high and must be reduced as described above.

##### Anodes:

In general, only tin anodes should be used. However, small amounts of steel anodes, not more than 10 per cent, distributed throughout the tank may prove advantageous in maintaining the color of deposits.

When the solution is operating properly the anodes will have a definite yellow-green color during electrolysis. When the solution is idle this color disappears. Coating over or insulating of the anode indicates too high an anode current density or too low a caustic content. Under these conditions the metal content of the solution decreases quite rapidly and spongy deposits will be produced. Small amounts of caustic soda (1/4 to 1/2 oz./gal.) will overcome this tendency.

##### Replenishing:

Replenishing may be made by means of a stock solution of the following composition:

Sodium Stannate .....	32 ozs./gal.
Caustic Soda .....	2 ozs./gal.
Sodium Acetate .....	4 ozs./gal.
Hydrogen Peroxide (25 vol.).....	1 oz./gal.
or	
Sodium Perborate.....	1/2 oz./gal.

One gallon of this solution should be sufficient for every 100 gallons of plating solution during an 8-hour day.



The proper density of the bath is about 10° Be. (sp. gr. 1.075).

#### Bath Control, Analytical Methods

##### Solutions required:

1. Standard stannous chloride solution.
2. Standard iodine solution.
3. Standard sulphuric acid solution.
4. Starch indicator solution.
5. Thymol-phthalein indicator solution (1% alcoholic).

##### Free Caustic Soda Content:

Sulphuric acid is used to titrate the free alkalinity because it can be very readily and accurately standardized by determining the sulphate as barium sulphate. The procedure is as follows: 10 cc. of a filtered sample of the plating solution accurately measured with a pipette are placed in a 400 cc. beaker and diluted with 200 cc. of water. Five (5) drops of thymol-phthalein indicator solution are then added and the solution titrated with 0.2 N. sulphuric acid. The acid should be added slowly with stirring until the blue color produced by the indicator just disappears. The end point is fairly sharp. The normality of the free caustic soda content is calculated as follows:

$$\frac{\text{cc. acid used} \times (\text{normality of acid} \times 0.04) \times 100}{40}$$

Normality of Free Alkali in the Plating Solution.

Ounces per gallon may be calculated from normality as follows:

$$\text{Normality} \times 40 \times 0.134 = \text{ozs./gal.}$$

##### Sodium Stannate Content:

A number of methods for determining the sodium stannate content have been tried out. The following one gives the most accurate results:

5 cc. of a filtered sample of the plating solution are accurately measured by means of a pipette, into a 500 cc. Erlenmeyer flask. To this is added 100 cc. of water and 100 cc. of conc. HCl. To this mixture 10 cc. of saturated sodium bicarbonate solution are added in order to drive out the air and create an atmosphere of carbon dioxide in the flask. The flask is then closed by means of a two-holed rubber stopper. One hole in the stopper is sealed by means of a glass rod. Into the other a side arm is inserted. The side arm dips into 50 cc. of sodium bicarbonate solution contained in a small beaker. In this manner the flask is sealed off and no air can enter. When all is assembled, 2 grams of finely powdered antimony are added and the mixture is boiled for 15 to 20 minutes. At the end of this time the contents of the flask are cooled by immersion in cold water. By this means the bicarbonate solution is drawn into the flask through the side arm thereby preventing access of air and possible oxidation. When cool, remove the glass rod from the stopper and titrate with 0.1 N. iodine solution, using starch solution as an indicator. Ounces per gallon of sodium stannate may be calculated as follows:

$$\frac{\text{cc. I}_2 \text{ sol.} \times 200 \times (\text{sodium stannate equiv. of the I}_2 \text{ sol. in g} \times 0.134)}{100} = \text{oz./gal. of sodium stannate.}$$

##### Standardization of the Iodine Solution:

1. Dissolve 5.79 grams of C.P. tin in 150 cc. of boiling conc. HCl in an Erlenmeyer flask. When

solution has been effected, dilute to 1000 cc. in a volumetric flask.

$$1 \text{ cc} = 0.00579 \text{ gr. Sn.}$$

2. Dissolve 12.7 grams C.P. Iodine in 20 grams of KI in as little water as possible. Make up to 1 liter and standardize against the tin solution, using the same procedure as described above for determining sodium stannate content.

Above methods of analysis are described "Standard Method of Chemical Analysis," Scott, 4th edition, Volume 1, pp. 533-536a.

#### Cleaning Prior to Tin Plating

The necessity for obtaining a chemically clean surface on the base metal makes thorough cleaning of the work of vital importance. The use of proper facilities and equipment for cleaning is of equal importance to that for the actual plating. In general, steel, copper or brass may be cleaned as follows:

##### 1. Removal of Grease:

Heavy grease or oil may best be removed by means of organic solvents. Trichlorethylene being non-inflammable, is highly recommended for this purpose.

After the preliminary removal of grease the work should be subjected to a short period of electrolytic cleaning by making it the cathode for 1 to 3 minutes in a solution of the following composition:

Sodium Cyanide .....	2 oz./gal.
Tri Sodium Phosphate .....	2 "
Caustic Soda .....	4 "
Temp. of solution—140°—180°F	
Cathode Current Density—50-100 A/SF	

Thorough rinsing before placing in an acid pickle is essential.

##### 2. Removal of Rust, Heat or Fire Scale:

For removing light rust or scale from steel use the following pickle:

Muriatic Acid (31%) .....	1 part
Water .....	1 part
Temp. of solution—120—180°F	

For heavy rust or scale use the following pickle:

Sulphuric Acid (66° Bé 93%)—2 parts by volume	
Muriatic Acid (31%) .....	1 part "
Water .....	8 parts "
Temp. of solution—140°—160°F	

Fire scale on copper or brass may readily be removed by immersion for a brief period (1 to 5 min.) in a pickle containing:

Muriatic Acid (31%) .....	1 part
Water .....	1 "

or by **Bright Dipping** in a solution containing,—

66° Bé Sulphuric Acid .....	48 ozs./gal.
70% Nitric Acid .....	9 "
31% Muriatic Acid .....	0.5 "
Water .....	68 "

Thorough rinsing in cold water after acid pickling is essential.

After grease and rust or scale have been removed a brief immersion (1 to 10 min.) period in the following solution is of great aid in producing a uniform chemically clean surface prior to plating:

Sodium Cyanide—2 oz./gal.	
Temp.—140°—160°F.	



# THE METAL INDUSTRY

With Which Are Incorporated  
The Aluminum World, Copper and Brass, The Brass Founder and Finisher, The Electro-Platers' Review

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PALMER H. LANGDON.....Editor and Publisher  
ADOLPH BREGMAN.....Managing Editor

THOMAS A. TRUMBOUR.....Business Manager  
EVAN J. ROBINSON.....Advertising Manager

Address all correspondence to The Metal Industry, 116 John St., New York. Telephone, BEekman 3-0404. Cable Address Metalustry.

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Edition this Month, 6,000 Copies. Buyers Guide, Advertising Page 57.

# Editorial

## The Chromium Plating Patent Situation

The patent on chromium plating No. 1,581,188, issued to Dr. C. G. Fink on April 20, 1926, and owned by United Chromium, Inc., has been held valid according to the decision of Judge Thomas of the U. S. District Court in Hartford, Conn., October 20, 1931. (See *THE METAL INDUSTRY* for November, 1931, p. 465-68, for the decision in full.) This patent covers, among other things, the **regulation** of solutions containing chromic acid and chromic sulphate, of a type widely used in the electroplating industry. Regulation includes analysis and the calculation of subsequent additions to the solution to bring it to its best proportions.

If *THE METAL INDUSTRY* were to give advice along these lines on chromium solutions, it might be liable to action for assisting in the infringement of the above described patent. For that reason we shall be unable to make analyses, give advice or answer questions on chromium solutions based on chromic acid and chromic sulphate.

We shall continue to help our readers in every possible way with their other shop problems, in which patents are not involved.

## Unemployment—Alleviation and Prevention

The worst element socially, and perhaps, most important from the standpoint of economics of the depression, is unemployment. The social harm is obvious. The economic harm has become increasingly clear as the loss of purchasing power reacts so quickly upon business.

The best way to treat this problem is, of course, by prevention. But throughout all history to date, no successful method has ever been devised for preventing unemployment. At best, complete employment has existed only in a few local centers and for a comparatively short time. Even in our own heydays we have always had our so-called "standing army" of as many as 1,000,000 unemployed. It seems, therefore, that at the present time at least, it is possible to discuss this question only from the standpoint of alleviation.

There are many plans in operation throughout the world. Most of the industrialized nations of Europe have one form or another of unemployment insurance which is supported by contributions from the workers, the employers and the Government. The weak link in the chain of such plans, which has been glaringly apparent in the British system, is the fact that the disbursements in bad times have far outstripped the capacity of the funds. The deficits have been made up by "borrowing" from the government and these borrowings have grown so large as to be practically

unrepayable, making them in fact additional contributions from the government. This is, of course, a complete subversion of the principles of an economically sound plan and for that reason has been given the uncomplimentary name "dole"; so much so that the opponents of unemployment insurance in the United States have been successful in making the term employment insurance seem synonymous with the word dole, and fastening the unsavory refutation of an unsuccessful plan upon the whole idea in principle. Nevertheless we find here and there independent opinions which explain in a fair measure that does have been actually justifiable in some situations. Major A. E. Carpenter of E. F. Houghton and Company for example says:

"For one thing the dole eliminates bread lines; and, since it is largely paid by the manufacturer and the state, it is equally distributed and is enough to provide for actual necessities. . . . The burden is not shouldered by private charities, which, generally speaking, would be inadequate to meet the demands."

The General Electric Company has an unemployment insurance plan supported by contributions from the employees and the company, under which disbursements must remain within the limits of the funds available. It is recognized, however, that at times these limits may be too narrow, and for that reason the board of directors can be asked to authorize additional payments by the company to emergency funds.

Our present method of handling the situation generally throughout the United States consists of private contributions or gifts to an emergency board for unemployment relief, appointed by the President. These funds are not to be distributed in the form of charity but as payment for work which is provided, useful, of course, but which otherwise, in the absence of such funds would remain undone. Such work might consist of cleaning up streets and parks, modernizing public buildings, etc.

One element in this situation stands out as of very great significance and that is the fact that capital and management as well as our government are recognizing openly and explicitly their obligation to shoulder at least a share of a burden which a generation ago, it was common for them to ignore as none of their affair. The American Engineering Council has published a statement that there is a very pronounced feeling that industry and commerce are largely responsible for the perplexities which have arisen, and that they should provide a satisfactory solution. This thought is not confined to any so-called radical group but it also prevails among fair-minded, far-seeing men and women.

The problem of alleviating first, and then if possible, preventing unemployment calls for definite and progressive planning just as the maintenance of our eco-

conomic stability. As a matter of fact, these two problems are practically inseparable.

### Copper Troubles

The international conference of the copper producers which lasted for weeks in New York, finally broke up without agreement due to the resistance of the Belgian group (Katanga mines), whose demands for their capacity allowance were too great to be granted by the other producers. Shortly afterward, however, cables from Belgium were received accepting the proposals which had previously been rejected, and it seems that agreement has been effected whereby the production of copper will be decreased to a point which will permit surplus stocks to be consumed.

In the meantime the Phelps-Dodge Company, one of America's largest copper producers, had withdrawn from Copper Exporters, Inc., the co-operative selling agency for American copper outside of the United States. This, it is thought by some, may result in the break up of Copper Exporters, Inc., although the subsequent agreement with the Katanga Mines and the voluntary decrease in production by the Phelps-Dodge companies to 26 per cent of their capacity, may hold it together. So far about 70 per cent of the world's producing capacity has agreed to operate on a 25 per cent basis. Now the work consists of persuading the smaller producers to fall in line and accept a similar arrangement.

In the meantime several large American copper mining companies are agitating for a tariff on copper on the ground that our foreign markets will soon be lost because of the ability of the African and Canadian South American mines to produce so much more cheaply than we, and that they have now achieved an output which will dominate the foreign market.

The passing of new tariff legislation carries with it the complication of re-opening the whole question before Congress, and this question is now generally admitted to be thoroughly unpopular with the people. Nevertheless, it is our guess that if Copper Exporters disbands and if copper prices remain at low levels during the coming year, we shall see a tariff on imported copper and a complete reversal of America's position in the copper market.

### Will Silver Come Back?

The world production of silver in 1931, as closely as can be estimated at this time, will be about 200,000,000 ounces, of which 50,000,000 ounces go into industrial uses. The value of the total silver produced amounts to only about \$56,000,000.

It is this situation that has prompted many of those engaged in producing or using silver to advocate its return as a monetary metal, perhaps not with a fixed ratio, but at least with some sort of standing in order to re-open to it, its greatest field.

A committee of experts of the International Chamber of Commerce, headed by Silas A. Strawn, chairman of the American Chamber's silver committee, after an extended investigation has made other proposals, however, based upon the likelihood that neither governmental action to monetize metal nor an international conference will take place in the immediate future. This committee recommends an international silver selling agreement which should include China and India. The Committee also recommends strongly, active research through the establishment of institutes for the purpose of devising new uses for silver, and of developing a method of preventing tarnish.

The Committee pointed out what seemed to it to be a serious handicap in the way of silver consumption, that there is too wide a margin between the wholesale price of silver to the manufacturer and the retail price of silver articles to the consumer.

The last statement is particularly interesting to silver manufacturing companies. Of course, the spread varies in different countries due to varying costs of labor and other items, but we wonder how generally true this is in the United States. Perhaps some of our leading silver manufacturers could enlighten us.

### The British Tariff

The long awaited and widely feared British tariff has finally been enacted. So far as America is concerned it has passed us by leaving us almost unscathed. Out of a total of American exports to Great Britain in 1929 of \$848,000,000, only \$18,600,000 are liable to the new tariffs. Of this small figure only a part consists of metal products and manufactures, including in round numbers about \$3,300,000 worth of typewriters; \$1,880,000 in hand tools other than agricultural; \$1,475,000 vacuum cleaners; \$730,000 metal furniture; \$630,000 radio sets.

Under the terms of the Runciman tariff act, British Dominions will receive a 100 per cent rebate, thus escaping the increases completely. Foreknowledge of this arrangement impelled American manufacturers to buy 154 new factory sites in Great Britain, making a total of 500 American owned or leased factories in the United Kingdom.

It seems that what was feared as a real danger to American trade with Britain has turned out to be a matter of comparatively small importance.

### The Metal Industry Takes New Offices

After years at 99 John Street, New York, THE METAL INDUSTRY has moved its offices to larger and improved quarters at 116 John Street. Our telephone number remains unchanged—Beekman 3-0404.

It is important that readers sending us sample solutions for analysis and other packages, address their mail to 116 John Street, in order to avoid the delay caused by forwarding.



## Correspondence and Discussion

### Bright Cadmium

To the Editor of THE METAL INDUSTRY:

On page 401 in your issue of September, 1931, we note that the answer to Problem 5026 suggests the dipping of cadmium plated work in a solution of one ounce nitric acid per gallon of water for the purpose of brightening the deposit.

In this connection, we wish to call your attention to the U. S. patent to Ganser, No. 1,816,837, issued August 4, 1931. This patent claims the treatment of cadmium plated goods as they come from the plating solution, or before perceptible change has taken place in the deposit, with dilute aqueous solutions of oxidizing acids in general, and of nitric acid in particular, for the purpose of brightening the deposit.

Any use of such process would require the authorization of our exclusive licensee, Hanson-Van Winkle-Munning Company, Matawan, New Jersey, which has the sole right of granting licenses under the said patent.

Newark, N. J.

THE CADMIUM CORPORATION,  
By RAYMOND O. PIGEON, Secretary.

When the answer to the problem mentioned was given, the writer was not aware that the method of dipping cadmium plated work in a dilute solution of nitric acid to brighten the deposit was a patented process. In the future, if questions are desired on this subject, they shall be referred to your licensee, O. J. S.

### Pickling Brass and Bronze

To the Editor of THE METAL INDUSTRY:

In your September issue I notice Problem No. 5031, W. J. R., on page 402, the formula for Bright Dip Mixture for Brass:

Oil of vitriol .....	1 gal.
Aqua fortis .....	1 gal.
Muriatic acid .....	2 gal.
Water .....	1 quart

I am wondering where this formula came from, or if the writer of that problem answer has used this mixture and knows of any place that it is being used? I have always used the following formula:

Nitric acid .....	2 gals.
Sulphuric acid .....	1 gal.

Muriatic acid, 1 ounce to 5 gallons of the above mixture.

No water is used, and the proportion of the nitric and sulphuric acid can be varied up to equal parts of each, depending upon the kind of brass or bronze being dipped.

I am afraid that anyone mixing the formula you have given in the Problem No. 5031 would be overcome, if not killed, by the fumes, and unless the mixing were done under a hood or with a very strong exhaust fan that the fumes would cause everyone in the building to experience a very unpleasant hour or two—perhaps for the day there would be no one able to stand the fumes. The amount of muriatic acid is entirely out of proportion. (If muriatic acid must be used at all, and I cannot see any use for it, the two ounces would be sufficient.) The only time I put any muriatic acid in this dip is when the dip is old and has become dead or sluggish, and then a few ounces or an ounce is plenty, and even then I doubt whether it is advisable.

I do not wish to be considered critical, I only wish to avoid any fatality which might occur if anyone should try to mix 2 gallons of muriatic acid into a mixture of one each of nitric and sulphuric, which is practically what you advise.

Should you, however, know of this mixture being used anywhere I shall be pleased if you will let me know of it.

Detroit, Mich.

T. C. EICHSTAEDT.

If Mr. Eichstaedt has any criticism to make regarding this formula he will have to blame the text book, for he will note in the answer it states: "Bright dip mixtures as given in most text books" consists of the formula given. For Mr. Eichstaedt's information, I personally know of companies using this mixture for bright dipping rough castings such as valves, etc., twenty years ago, without any disaster. However, it is necessary to have a hood over the dipping tank and good ventilation.

Mr. Eichstaedt may have better formulas than the one given. He will note, however, that I did not recommend this formula as the best. I gave it as given in the text books. What I did recommend was given in my answer, and anyone using this process and formula I feel will get desirable results.

Thanks for the criticism.

W. J. REARDON.

### Technical Papers

**British Engineering Standards.** The following publications are available from the Publications Department of the British Engineering Standards Association, 28 Victoria Street, London, S. W. 1, England. Prices mentioned include postage. No. 263, British Standard Specification for Brazing Solders; new edition, 1931; 2s 2d. No. 421, British Standard Specification for Chemical and Physical Properties of Phosphor Bronze Castings for Gear Blanks; new edition, 1931; 2s 2d. No. 417, Galvanized Cisterns and Hot Water Tanks; 1931 edition, 2s 2d.

—A. E.

### New Books

**Electric Arc Welding.** Published by Hobart Brothers Company, Troy, Ohio. Size 4 x 7, 80 pages. Price \$1.00. (Direct from the publishers).

This booklet aims to present such facts about electric arc welding as are essential to its successful application to practical work. It includes chapters on welding equipment; types of joints and welds; weldability of metals; choice of the electrodes, using the metallic arc and the carbon arc; speed and cost of arc welding.

**Handbook of Commercial and Financial Information Service.** Published by the Special Libraries Association. Size 6½ x 10, 92 pages, paper covered. Price \$2.00.

This new handbook lists 214 important services describing the type of information each offers, its cost and frequency of publication. The introduction contains a functional analysis and appraisal of the services by experts in the fields of finance, advertising, sales and insurance. It is the only handbook of its kind.

### Government Publications

Government publications are available from the Superintendent of Documents, Government Printing Office, Washington, D. C., to whom proper remittance should be made to cover price where a charge is mentioned. In some cases, as indicated, application should be made to the governmental body responsible for the publication.

**Nonferrous Rods for Gas Welding.** Federal Specifications Board, Washington, D. C. Proposed revision of F. S. No. 269a. Circular of particulars available from Board on request. Comment from interested parties is solicited.

**Foundry Patterns of Wood.** Bureau of Standards, Department of Commerce, Washington, D. C. Reaffirmation of Commercial Standard CS19-30, without change. Circular giving a report on this standard is available from the Bureau.

# Shop Problems

This Department Will Answer Questions Relating to Shop Practice.

## ASSOCIATE EDITORS

### Metallurgical, Foundry, Rolling Mill, Mechanical

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W. J. REARDON

W. J. PETTIS  
P. W. BLAIR

### Electroplating, Polishing, and Metal Finishing

O. J. SIZELOVE  
G. B. HOGABOOM

A. K. GRAHAM, Ph.D.  
WALTER FRAINE

Solutions sent for analysis must be **PROPERLY PACKED**, to prevent leakage and breakage. Label all bottles with name and address of sender. Mail all samples to 116 John St., New York.

### Cadmium Plate

Q.—We are doing considerable cadmium plating in our plant, and one of the large-quantity items is steel condenser cradles made in various lengths. We are giving these cradles a seven- to eight-minute plate, and find that the finish looks fairly good when the work leaves the plating tank. The work is then rinsed and put in a hot water tank and dried in hard wood sawdust, steam heated. We find that during this drying process the plated surface develops brown stains which are rather unsightly.

We would appreciate it if you could give us some information which would help eliminate these brown stains on the cadmium plated surface.

A.—Deposits of cadmium as a general rule are more difficult to dry without staining than other electro-deposits. It is good practise in drying cadmium plated work to use a good supply of both cold and hot water for rinsing purposes, and to employ a soap water solution made of one ounce of Ivory soap chips to 5 gallons of water. Use this soap solution previous to the hot water rinse, and dry in clean hardwood sawdust.

Denatured alcohol is also used with good results in the drying of cadmium deposits, but the cost is greater.

Deposits of cadmium from a solution that is in poor operating condition, or those that contain an excess of caustic soda, will stain very readily.

O. J. S., Problem 5,052.

### Casting Aluminum

Q.—Would you consider No. 43 aluminum alloy superior to No. 12 alloy with the silicon addition of from 2 per cent to 4 per cent to cast aluminum patterns? Is it necessary to add to the height of the sprue in casting aluminum?

We have an order for aluminum castings of considerable bulk, which we previously cast in brass, using a sprue about 6 in. in height. What we desire to know is how much additional length it is necessary to add to the length of the sprue to get the required pressure in aluminum.

A.—No. 43 alloy is similar to S. A. E. alloy No. 35. This alloy is intended for automobile body parts and other parts that must be cast in thin section, such as panels for buildings, etc. The alloy withstands salt water corrosion very well and is, therefore, suitable for aircraft engine parts that may be subjected to corroding influences. The alloy has a low yield point and therefore cannot be used where great strength or stiffness is required.

We are of the opinion that No. 12 alloy containing 2 to 3 per cent silicon would be more satisfactory for aluminum patterns.

In reference to height of sprue, as to additional height necessary to pour aluminum casting where brass had previously been poured, that would all depend upon the shape and weight of casting. If the casting is light, no more height is required. It is rather hard to say just what is required without seeing the work. However, there should not be any great deal of trouble determining the height, etc., after casting one casting. Your foundry should be able to determine this question easily.

W. J. R., Problem 5,053.

### Centrifugal Casting

Q.—We are wondering if you can supply us detailed data regarding the process used in spinning brass bushings. We understand this method is being employed in several foundries throughout the East; also, some time ago a foundry in Sandusky, Ohio, had a patent on the method.

A.—In reference to spinning brass bushings, this is done in centrifugal casting, and for detailed information, we would refer you to articles in *THE METAL INDUSTRY*, as follows: December, 1922, by Leon Common; also by Robert F. Wood; July, 1925, p. 278; May, 1922, p. 186; December, 1925, p. 491.

This class of work is now being done by several companies very successfully.

W. J. R., Problem 5,054.

### Copper on Galvanized Steel

Q.—My platers find it impossible to copper plate steel that has been hot galvanized. I have instructed them as follows: After snagging, to wash, dry in sawdust, clean in a commercial cleaner without electricity, hang in nickel tank, giving all the current they will stand without burning, then flash in cyanide copper, scratch-brush, and copper plate heavy enough to stand buffing. After buffing we lacquer the work.

We find two imperfections: the plate lifts and the article seems to spot out after a few hours.

A.—You should have no trouble in copper plating the galvanized steel parts, providing the condition of the copper solution is right, and proper cleaning methods are used.

If the work has been lying around for some time, it has probably formed an oxidation that prevents proper adhesion of the deposit. In this case, we would suggest that the work be potashed in a fairly strong cleaning solution. Then either scratchbrush the work or else scrub with water and fine pumice to remove the oxidation. Then rack or wire the work; clean in usual way; and plate in copper solution direct without nickel plating. If the work is nickel plated, a special type of nickel solution will be necessary. One that is used for zinc die cast work should be used.

After trying the above suggestions, if you still have trouble, we would suggest that you strip the zinc from the steel and then copper plate. The zinc can be readily removed in a hot muriatic acid dip without doing any harm to the steel.

O. J. S., Problem 5,055.

### Dissolving Silver

Q.—Kindly give me a formula for dissolving silver to make chloride silver of it, or nitrate.

A.—Chloride of silver is made by adding hydrochloric acid to a solution of silver nitrate. In dissolving the silver with nitric acid, use a small quantity of water with the acid; if heat is applied the chemical action will be greatly hastened. A mixture of 1 part water to 4 parts of nitric acid will give good results.

When the silver is all dissolved, dilute the volume of solution with water and add the hydrochloric acid. The precipitate of

silver chloride should be washed until free from acid. The silver chloride should be kept in a dark place, for the action of light upon it has a tendency to darken the silver chloride.

O. J. S., Problem 5,056.

### Electro-Cleaning with A. C.

Q.—Could you give us any information on the electro-cleaning of steel parts using alternating current, if such is possible? We have been under the impression that the process has been used to some extent commercially, but several small scale experiments which we have performed have been unsuccessful.

Could you also suggest a standard reference giving directions for the coloring of plated finishes?

A.—From the information that we have been able to get on the use of the alternating current for electro-cleaning it has not proved successful. It has been tried, and when used on non-ferrous metals an oxidation takes place that is very hard to remove. As far as we know, it has not been tried on ferrous metals.

O. J. S., Problem 5,057.

### Etching Name Plates

Q.—Kindly furnish us with technical information regarding the process of etching name plates, in particular the methods used to obtain a black background on aluminum and brass.

A.—The photographic method is undoubtedly the cheapest to use in the making of name plates.

The best etching reagent for brass is perchloride of iron, and after the etching operation is completed, the plates are immersed in a solution of carbonate of copper and ammonia to produce a black background, the resist preventing the highlights from becoming black.

The carbonate of copper and ammonia dip is made by using 1 lb. of carbonate of copper, 1 quart of 26° ammonia, 3 quarts of water. Add the water after the copper carbonate and ammonia have been thoroughly mixed. Use at 175°F., under an exhaust hood.

A 10 per cent solution of hydrofluoric acid is probably the best etching reagent for aluminum; it works without attacking the resist. After the etching operation is completed, the work is given a dip in a solution made of 2 parts sulphuric and 1 part nitric acid, and plated in a black nickel solution to produce a black background.

O. J. S., Problem 5,058.

### Plating Mirror-Backs

Q.—We are confronted with the problem of plating a metal backing over the silver on mirrors; we wonder if you have any information on this subject; in the event that you have, will you be kind enough to tell us how this is done?

A.—Two copper solutions are usually used in depositing copper as a backing for silver mirrors. The first is used as a strike and contains very little free acid and a low metal content. Such a solution is made by dissolving 16 oz. copper sulphate in one gallon of water.

The other copper solution is the regular bath, and is made by using 28 oz. copper sulphate and 5 oz. sulphuric acid to one gallon of water.

The work is left in the first solution only long enough for the deposit to cover the silver; then it is transferred to the second bath, and the deposit built up to any thickness desired.

O. J. S., Problem 5,059.

### Oxidizing Aluminum

Q.—Can aluminum be successfully oxidized, or will it have a tendency to peel or flake away from the aluminum?

A.—In producing oxidized finishes upon aluminum, it is best to nickel plate the aluminum before the copper, brass, or silver plating operations. If the aluminum is nickel plated, we do not believe that you will have any difficulty with the oxidized finish flaking off. For method of plating aluminum write to the Aluminum Company of America, Buffalo, N. Y., for a copy of their booklet entitled "Electroplating Aluminum."

O. J. S., Problem 5,060.

### French Grey Finish

Q.—In your magazine we frequently find the term French Grey plating used. We produce French Grey finishes but have never heard of French Grey plating and we would appreciate any information you could furnish.

A.—If the term "French Grey Plating" has been used, there has undoubtedly been some error, as we know of no method of producing a French Grey finish by a plating method.

There is a method of plating the oxidation on the work instead of using a dip before the work is relieved or brushed, but we can see no good reason for its use. With this method, golden sulphuret of antimony is added to a silver strike solution until a darkening effect is produced before the finishing operations.

O. J. S., Problem 5,061.

### Plating Name Plates

Q.—We are having trouble with our silver name plates peeling when being engraved by an engraving machine. We have tried various types of cleaners and various grades of metals. However, all seem to peel, and we have come to the conclusion that there is something wrong with our silver solution.

We are sending under separate cover a small sample of our solution which we will appreciate having you analyze. Please inform us as to what is needed to put this solution in first class condition.

A.—Analysis of silver solution:

Metallic silver .....	1.05 ozs.
Free cyanide .....	4.18 ozs.

The metal content of the solution is too low. We suggest that you add 2 ounces of silver cyanide and 2 ounces of sodium cyanide to each gallon of solution.

This addition will put the silver solution in first class condition, and should you still have trouble the fault will be found either with the silver strike or the cleaning method. If you will send us a sample of the silver strike, we will analyze it for you.

O. J. S., Problem 5,062.

### Protecting Copper Plated Stovepipe

Q.—We copper plate ordinary black stovepipe. However, after the pipe is in use and subjected to heat, it oxidizes.

Can you tell us any way to prevent the oxidizing?

A.—We believe that your difficulty will be overcome by using the proper grade of lacquer. We would suggest that you subject the sample that is being sent to you to the usual degree of heat, and if results are satisfactory, consult the lacquer manufacturers advertising in THE METAL INDUSTRY for this special type of lacquer.

O. J. S., Problem 5,063.

### Reclaiming Solder

Q.—We have a quantity of solder made up of small and varying quality pieces. As we are not sure of the composition of these pieces, and think they might contain zinc, we intend melting these, and we would very much appreciate your telling us how to get the zinc and other impurities out so as to make it serviceable.

A.—If your solder contains a small amount of zinc or other impurities, to remove the zinc melt this solder in your solder pot; boil by inserting a raw potato or a block of green wood to the bottom of the kettle; boil the metal thoroughly. Then add sal-ammoniac. Let stand for a few minutes and skim.

Boil metal again and cover with litharge (oxide of lead), and let it stand for 30 to 50 minutes, depending upon the amount of solder you want to refine. Lower the fire under the kettle so that the metal remains just melted, then skim and the zinc will be removed. That is, if the metal contains not over 1 per cent zinc.

Over 1 per cent requires an increased heat which will burn out as much zinc as possible. Then you boil the metal and use same process as given for less than 1 per cent. The zinc is given off readily and goes with the slag. Flux with rosin and sal-ammoniac.

W. J. R., Problem 5,064.



# Patents

## A Review of Current Patents of Interest

Printed copies of patents can be obtained for 10 cents each from the Commissioner of Patents, Washington, D. C.

1,823,402. September 15, 1931. **Silver Cleaning Composition.** Grinnell Jones and Dorothy Weed Marshall, Cambridge, Mass., said Dorothy Weed Marshall assignor to said Jones.

A silver cleaning composition of the abrasive type, containing infusorial earth substantially 20%, sodium oleate substantially 20%, an alkali metal halide 5 to 15%, balance water.

1,822,877. September 15, 1931. **Method of Treating Aluminum Base Alloys Which Are Subjected to Growth.** Robert S. Archer and William L. Fink, Cleveland, Ohio, assignors to Aluminum Company of America, Pittsburgh, Pa.

The method of developing substantially complete and permanent volume change in an aluminum base alloy which is subject to growth, comprising heating the alloy to a temperature of from about 150° to 265° C. and continuing said heating until the hardness of the alloy has passed through its maximum and the alloy has attained a substantially complete and permanent increase in volume.

1,823,869. September 15, 1931. **Coating of Bodies with Metal.** Walter Baur, Cologne-Braunsfeld, Germany.

The method of forming a protective coating upon plane metallic work-pieces, consisting in intimately mixing a liquid agglutinant with a pulverulent metal, coating the surfaces to be protected uniformly with said mixture, heating the coated surfaces until the agglutinant commences to harden, introducing the respective work-pieces between rollers, moving each coated work-piece forward between the rollers and subjecting it at the same time to a pressure of such a strength that the thickness of the coating is reduced and a part thereof is forced into the pores and inequalities of the metallic surface coated.

1,823,938. September 22, 1931. **Process for the Production of Silver Plated Metal Articles such as Table Requisites.** Gustav Henke, Bremen, Germany, assignor to M. H. Wilkins & Söhne Akt.-Ges. Hemelingen, near Bremen, Germany.

A process for producing silver plated metal articles such as knives, forks, spoons and the like, consisting in coating an articles of non-ferrous metal, mechanically working the coated member, heating the said member to incandescence effecting a fusion of the silver layer with the surface crystals of the blank, applying a second coating of silver to the member, cold working the second coat, and subjecting it to heat to produce incandescence.

1,823,177. September 22, 1931. **Process for Production of Pigmented Pyroxylin Compositions.** Arnold M. Taylor and Arthur R. Chapman, Stamford, Conn., assignors to Atlas Powder Company, Wilmington, Del.

The herein described process of preparing a lacquer enamel which will dry with a high gloss, which consists of employing a moisture bearing pigment and designedly absorbing the moisture therefrom by wetting the same with an anhydrous highly hygroscopic organic liquid, and thereafter incorporating the wetted pigment in a nitro-cellulose solution.

1,824,100. September 22, 1931. **Process for Electrolytic Deposit of Heavy Metals.** Max Schlötter, Berlin, Germany.

Process for electrolytic deposit of metals of the lead group which consists in the use of metal salts in which the metal to be deposited is partly bound to an organic and partly to an inorganic anion.

1,824,966. September 29, 1931. **Alloys and Process for Improving Workability of Same.** Norman B. Pilling, Elizabeth, N. J., assignor, by mesne assignments, to the International Nickel Company, Inc., New York, N. Y.

The process for producing alloys containing nickel which includes deoxidizing the principal melt and subsequently adding thereto a metal of the alkaline earth group.

1,825,189. September 29, 1931. **Electrodeposited Pattern.** Arthur K. Laukel, Detroit, Mich.

A metal pattern consisting of a shell of electrolytically deposited metal of insufficient thickness to withstand manipulation in molding operations, and a filling material therein for reinforcing the same, said material being of a character capable of withstanding high production molding operations.

1,825,242. September 29, 1931. **Process of Producing Castings of Magnesium and High Grade Magnesium Alloys.** Albert Levy Mond, London, England, assignor to I. G. Farbenindustrie Aktiengesellschaft, Frankfurt-on-the-Main, Germany.

A process of producing castings of magnesium and high grade magnesium alloys which comprises bringing ammonium fluoride and an acid capable of absorbing ammonia into contact with the surface of the molten metal within the mould.

1,825,241. September 29, 1931. **Production of Metals from their Carbonyls.** Alwin Mittasch, Mannheim, and Leo Schlecht, Ludwigshafen-on-the-Rhine, Germany, assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfurt-on-the-Main, Germany.

In the production of metals by thermal decomposition of the corresponding metal carbonyl, the step of freeing of carbon monoxide, produced simultaneously with the metal, from carbon dioxide and metallic dust, and then acting therewith on further amounts of metal to produce metal carbonyl.

1,825,763. October 6, 1931. **Method of Plating Metals.** William E. Watkins, New York, N. Y., assignor to Copper Plate Sheet & Tube Company, New York, N. Y.

The process of plating metals, which consists of the following steps: applying to the metal to be plated a coating comprising a finely divided plating material, and a suitable liquid vehicle therefor; subjecting the metal to be plated together with the coating thereon to heat, and subsequently applying a second plating layer of metal by passing the plated metal through a molten bath of a metal having a lower melting point than the first plating metal.

1,826,159. October 6, 1931. **Electroplating.** Leon R. Westbrook, Cleveland Heights, Ohio, assignor, by mesne assignments, to The Grasselli Chemical Company, Cleveland, Ohio.

A composition of matter adapted for use in the preparation of an electroplating bath consisting of a mixture of 48 parts cadmium hydroxide, 120 parts sodium cyanide, 60 parts sodium sulfate, 1.5 parts crystallized nickel sulfate, and 12 parts Turkon oil.

1,826,239. October 6, 1931. **White Bronze.** Joseph H. Cheetham, Decatur, Ill., assignor to Mueller Co., Decatur, Ill.

An alloy of the class described, comprised copper 52 to 55%, tin 1.5 to 2.5%, lead 10 to 12%, zinc 15 to 19%, nickel 15 to 18%, iron in substantial amounts up to 0.75% and manganese in substantial amounts up to 0.25%.

1,826,866. October 13, 1931. **Proofing of Metal Against Corrosion and Particularly of Iron and Steel Against Rust.** William Howard Cole, Paris, France.

A composition for proofing metals against corrosion, consisting of a metallic stock solution which is a mixture of saturated solutions of iron, zinc, aluminum and chromium in an aqueous solution of phosphoric acid of concentration 12° Baumé, in the proportion of 5 parts of iron solution, 5 parts of zinc solution, 1 part of aluminum solution and ½ part chromium solution, to which metallic stock solution is added, in the proportion of 4cc. to each litre of the former solution, an accelerator stock solution which is an aqueous solution of bichromate of potassium (5 per cent) neutral chromate of potassium (14 per cent), mono-basic phosphate of ammonium (5 per cent) and naphthalene (1 per cent).

# Equipment

New and Useful Devices, Metals, Machinery and Supplies

## "Anti-Ambi" Thermometer

Extreme accuracy and freedom from the effects of ambient temperatures (case and tubing temperatures), are the claims made for the new "Anti-Ambi" recording thermometer recently developed by the Foxboro Company, Foxboro, Mass.



This new recording thermometer is said to give true bulb temperatures at all times, irrespective of summer heat or winter cold. The case and tubing may be enclosed in a cabinet, and the temperature changed rapidly or slowly up or down for 50°, and the pen will remain perfectly steady. The thermometer is designed for use on temperature ranges up to and including 250° F.

More detailed information on this instrument may be had by writing the Foxboro Company for Bulletin No. 178.

New Foxboro  
"Anti-Ambi"  
Thermometer

## New Rhodium Plating Process

The H. A. Wilson Company, 97 Chestnut Street, Newark, N. J., refiners and workers of platinum, gold, silver and other precious metals, announces that it has placed on the market a process for electroplating jewelry, silverware, etc., with rhodium. The company states that the process has been developed through considerable careful research, which has resulted in finding a rapid means of applying a very high grade rhodium plate to gold and silver. Rhodium is impervious to corrosion, and provides a permanently white, hard plate which adds to the wear resistance as well as the beauty of articles plated with it, the company says.

According to the announcement, the "Wilco" solution is simple to operate, being easier to work than a gold plating bath. The absence of gassing is stressed. It is applicable to any precious metal jewelry, even with stones set in, and also to all base metals except iron and alloys containing over 10 per cent zinc. Sterling silver can be plated without previously plating with nickel or palladium. According to the company, a good rhodium plate can be applied with the "Wilco" solution in 30 seconds or less.

Users can be supplied with the solution alone, together with all necessary materials, or, for those who have no plating equipment, a complete rhodium plating outfit is available. This consists of rheostat, voltmeter and ammeter on a panel; Pyrex beakers; enameled water bath container; four liters of "Wilco" rhodium solution; platinum anode.

The anode in this process is cylindrical, this shape having been found most satisfactory. Anodes are made in a variety of sizes to suit varying requirements. It is pointed out that the anode of platinum is merely an investment, being entirely reclaimable, since it is not affected by use in the rhodium bath.

Simple test directions and materials are provided, by means of which the user is able to determine the exact time for replenish-

ing the solution. This insures continuously perfect application of the rhodium plate, it is stated.

## New Cadmium Process

The Hanson-Van Winkle-Munning Company, Matawan, N. J., has just announced a new and improved method of cadmium plating known as "Cadalux." The outstanding feature of this new process is a brighter finish to the cadmium deposit. Other interesting features of this process are an exceptionally homogeneous and close grained crystal structure of the deposit, excellent throwing power, and a very accurate and simple method of solution control which makes it possible to maintain the solution at its highest point of operating efficiency at all times, the company states. In addition to these advantages, the solution is said to be easy to mix, operate and maintain, requiring no higher current densities than are necessary for the average cadmium plating. Many existing cadmium solutions can be converted to use with the "Cadalux" process, it is stated. The Hanson-Van Winkle-Munning Company is prepared to offer complete service for this process.

In addition, the company is prepared to offer a finishing process known as the "Nitri-Brite Dip" for use on articles plated with "Cadalux." This process is covered by U. S. Patent No. 1,816,837, it is stated. This is an acid treatment which provides an extremely high additional lustre, which eliminates the necessity of buffing or scratchbrushing, and at the same time has the practical advantage of reducing susceptibility of the plated surface to finger marks, stains, and other discolorations due to handling, packing, or assembly of plated parts, the announcement says.

## New Polishing Compounds

Harrison & Company, Haverhill, Mass., manufacturers of the "4A" line of cleaning and polishing compounds and compositions, announce the addition to their line of several new types of buffing and polishing materials.

The company has developed several new compositions for industrial buffing and polishing of stainless steels. New compounds for cutting down and buffing steel, nickel, brass, copper, aluminum, stainless steel and cutlery have been placed on the market recently, with considerable success, according to the company. This producer also has a composition for polishing celluloid in various forms.

The company offers to submit samples of its compositions to suit any outlined requirements. Special types of material for specific uses can be developed in co-operation with users.

## Suction Crane for Handling Metals

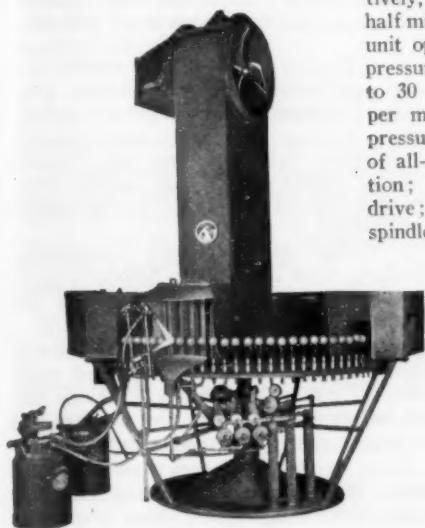
United Engineering & Foundry Company, Pittsburgh, Pa., has developed a suction crane for steel, non-ferrous and other flat materials where the surface must be preserved, and breaks or buckles are to be avoided, or where a magnet crane is inconvenient or unsuitable. Possible uses for the suction crane are almost unlimited, it is stated. It is held to be ideal for thin sheets, high-finish sheets, tin plate, chromium plated sheets, buffed copper sheets, and polished stainless strips. It is applicable to paper, cardboard, fiber, wallboard, glass and lumber.

The crane is a self-contained unit, consisting of a series of suction cups, mounted in a bracket suspended from a boom, bridge, or other crane construction. Vacuum is provided by a small motor-driven pump with air lines to the suction cups, the pump running continuously, and the vacuum control being a two-way valve which either applies the vacuum or lets the air in for release. Lifting power is determined by the size and number of vacuum cups.



## 90-Spindle Automatic Sprayer

Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, Ill., has developed a 90-spindle automatic spraying and drying equipment. The makers state that the new equipment has a capacity of 90 pieces per minute with table speed of 1 r.p.m., or 180 pieces per minute with table speed of 2 r.p.m. These speeds allow, respectively, one minute and one-half minute drying time. The unit operates entirely on air pressure, requiring from 20 to 30 cubic feet of free air per minute at 5 to 70 lbs. pressure. The machine is of all-steel, welded construction; has flexible airmeter drive; adjustable, removable spindles; water and oil separators and regulators; automatic gear spacer; automatic convertible airbrushes interchangeably designed for accommodation to a wide variety of work; "Clam-tight" cover pressure tanks; electric driving tunnel; fireproof ventilating unit.



Multiple Spindle Sprayer

The equipment is built in sizes to serve any particular purpose and is available for chain or belt conveyor service or as part of special production machinery. Complete engineering advisory service is offered.

The Paasche Company has also placed on the market a new unit for banding, shading and decorating of chinaware and similar products. It can apply several colors at once and is entirely automatic.

## New Aluminum-Silicon Alloy

The Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester, England, has placed on the market a new aluminum-silicon alloy known as "M. V. C. Alloy." This is stated to be a pure alloy of aluminum and silicon and is produced by a patented process giving a fine eutectic structure which is reflected in enhanced strength and ductility. The following data are given by the manufacturers:

The specific gravity of "M. V. C." is 2.68, slightly less than that of pure aluminum, while the ultimate tensile strength in the sand cast condition is 20,000 to 25,000 lb. per sq. in.; and in the chill cast condition 25,000 to 30,000 lb. per sq. in. The elongation on 2 in. is 5% to 10%; and the yield point is 12,500 lb. per sq. in.

The alloy can be rolled into thin sheet or drawn into bars or tubes, spun, pressed, or stamped. Castings can be bent or set to a considerable extent even when cold, without damage. Regarding this property, it may be noted that a test piece of section 1 in. x 1/4 in., is made from every melt and must withstand bending on 2 in. radius through an angle of 90° without breaking.

Extensive corrosion tests have been carried out on the alloy in the Metrovick research laboratories. The tests lasted 1,000 hours, representing years of service, and reproduced the main conditions of exposure at sea, namely, exposure to salt spray, alternate wetting and drying, and continuous partial immersion. The excellent behavior of the alloy in these tests has been confirmed in actual marine service.

The alloy can be readily forged at 200 deg. C., while the pouring temperature for casting is 650 deg. C. Good fluidity and freedom from hot shortness facilitate the production of sound castings, and the contraction on cooling is equal to that of cast iron, namely, 1/8 in. per ft.

Machining is readily carried out, employing a high speed and fine to medium feed. For turning, a top rake of 30° to 40° and a side rake of 10° to 15° are recommended; soapy water or paraffin and lard oil being suitable lubricants. For milling, coarse toothed cutters are preferable, fine cutters being liable to clog with the

swarf. The cutting faces should be well raked, not radial, and the cutting edges sharp and clean. Paraffin or turpentine should be used as lubricant. Similar principles apply to the cutting of screw threads and drilling. With sharp tools the alloy drills cleanly and takes a sharp clean thread. Paraffin is an excellent lubricant for this work.

The new alloy takes and keeps a fine polish and it can be welded easily and effectively by the oxy-acetylene torch, using a bare rod of the alloy as filling material. No flux is required.

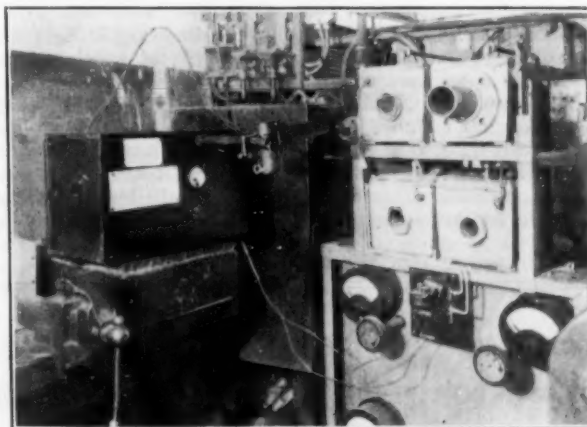
A. EYLES.

## Electric Eye for Furnace Control

The electric eye, or photoelectric tube, now turns to the special high temperature furnace to see that it does not get too hot; when the temperature rises to the desired limit, it operates a Thyatron tube which cuts off the current or fuel supply. Thus another addition is made to the list of uses for both the Thyatron and the photoelectric tubes. In the past it has been difficult to read the high temperatures required in special furnaces used for industrial and laboratory purposes, and it has been exceedingly difficult to control these furnaces or maintain a set temperature.

At the meeting of the American Chemical Society in Buffalo on August 31, Dr. L. R. Koller, of the General Electric research laboratory at Schenectady, announced a solution for the problem in using the photoelectric tube to measure the visible energy radiated by the hot body, and thereby its temperature. The photoelectric tube, with a suitable optical system, looks at the furnace wall or some object in the furnace. The current through the tube depends on the amount of light falling upon it, and accordingly varies with the brightness of the surface observed. Since the radiation from a hot body varies much faster than its temperature, the photo current is a very sensitive measure of temperature.

The photoelectric current is amplified by means of vacuum tubes and recorded on a meter calibrated in terms of temperature. The same current operates a Thyatron tube, and the latter acts as an extremely sensitive relay which controls the supply of fuel or electricity to the furnace. The photo tube pyrometer described by Dr. Koller can be used at temperatures as low as 1,000° C., and has no upper limit. It does not deteriorate due to the action of any products in the furnace, nor is any part of the apparatus itself in the furnace. It is instantaneous in its action, very sturdy, with



Photoelectric Furnace Control

no delicate moving parts. A single pyrometer reading supplies the calibration necessary from time to time. The control mechanism may be varied to suit individual needs, and by the use of two Thyatrons, both upper and lower limits of temperature may be set.

The apparatus includes a long photoelectric tube housing mounted on a hinged bracket which the operator can swing to one side in order to get at the furnace. As much as three or four feet may separate the tube from the furnace proper. The bracket is provided with a worm gear for ease in making adjustments. A small opening in the housing makes it possible to observe a light spot and make sure that it is centered on the diaphragm placed in front of the tube.



## Equipment and Supply Catalogs

**Welding and Cutting Equipment.** Bastian-Blessing Co., 240 E. Ontario Street, Chicago, Ill.

**Hoisting and Conveying Equipment.** Wright Mfg. Co., Bridgeport, Conn., Catalog No. 15.

**Automatic Control.** Brown Instrument Company, Philadelphia, Pa. Bulletin on control instruments.

**Lever Shears.** United Engineering & Foundry Co., Pittsburgh, Pa. Bulletin on shears for rolling mills.

**Brazing and Welding Compounds.** Krembs & Co., 669 W. Ohio Street, Chicago, Ill. Leaflet on the "Fluxine" line.

**Hobbing Machine.** Barber-Colman Co., Rockford, Ill. Bulletin on Type A hobbing machine, a new development.

**Stewart Melting Pot.** Chicago Flexible Shaft Co., Chicago, Ill. November issue of a pamphlet on industrial furnaces and kindred equipment.

**Refractories.** McLeod & Henry Co., Troy, N. Y. Bulletin on silicon-carbide super-refractories for lining furnaces, kilns, retorts, muffles, etc.

**Lathes.** South Bend Lathe Works, South Bend, Ind. Catalog No. 92, covering the Series "O" lathes, with considerable new material.

**Burnishers and Tumblers.** Lasalco, Inc., 2822 La Salle St., St. Louis, Mo. Bulletin 92, featuring some new equipment added to this maker's line.

**Individual Motor Drives.** Hertzler & Zook Co., Belleville, Pa. Drives for machine tools, including drives for modernizing belt-driven machinery.

**Silver.** Handy & Harman, 57 William Street, New York. Leaflet on the increasing demand for silver jewelry and other products. Very interesting.

**Heat Treating.** National Safety Council, Inc., 20 N. Wacker Drive, Chicago, Ill. No. 1 of the Industrial Safety Series, covering safe practices in heat treating.

**Sheet Carrier.** United Engineering & Foundry Co., Pittsburgh, Pa. A carrier or sling for handling sheet packs, piles and sheet-bar piles and similar material.

**Rotary Hearth Furnace.** W. S. Rockwell Co., 50 Church Street, New York. Furnace for heat-treating and forging non-ferrous and ferrous metals; electric or fuel.

**Welding Equipment.** Linde Air Products Co., 30 East 42nd Street, New York. Bulletin on a new type of welding equipment which is said to greatly facilitate the process.

**The Consulting Chemist and Your Business.** Foster D. Snell, Inc., 130 Clinton Street, Brooklyn, N. Y. Booklet on "a technical organization co-operating with industry."

**Roller Hearth Furnace.** W. S. Rockwell Co., 50 Church Street, New York. Interesting technical bulletin, No. 318, on physical factors affecting production of uniformly heat-treated products.

**Maintenance of Architectural Metals.** Metal Refinishing Products Co., 3019 E. 61st Street, Cleveland, Ohio. Leaflet on care and maintenance of architectural aluminum and other decorative metals.

**Small Motors.** Wagner Electric Co., 6400 Plymouth Avenue, St. Louis, Mo. 30-page bulletin on single-phase, polyphase and d. c. motors in fractional horsepower ratings. Profusely illustrated.

**Pattern Aluminum.** Niagara Falls Smelting and Refining Corporation, Buffalo, N. Y. Bulletin on "Falls" special alloy. Contains good table of commercial aluminum casting alloys, with applications and references.

**Mechanical Stokers.** Stoker Manufacturers Association, W. V. McAllister, secretary, foot of Walker Street, Detroit, Mich. Condensed catalog describing and illustrating the products of a large number of makers.

**Copper Arts.** U. S. Metals Refining Co., 61 Broadway, New York. A beautifully illustrated catalog of hand made copper pieces in a variety of colors, simulating in design and finish the ancient Pompeian, Chinese, Welsh, Roman and other productions. There are ash trays, bowls, trays, candlesticks, etc.

**Carbon Tetrachloride.** The Roessler and Hasslacher Chemical Company, Inc., 350 Fifth Avenue, New York. A 28-page booklet giving very complete information on this fluid; properties, uses, toxicity, test methods and other data in a semi-technical form; well worth the attention of anyone interested in C. T.

**Aluminum Alloy Castings.** The British Aluminum Co., Ltd., 122 E. 42nd Street, New York. Good illustrated booklet on aluminum castings of various types. Also, **Aluminum for Architecture**, similarly well illustrated and of considerable interest to founders and others concerned with production or use of architectural aluminum forms.

**Architectural Finishes for Aluminum.** Aluminum Co. of America, Pittsburgh, Pa. Specifications for finishes on alloy sand castings. A. I. A. File No. 15-J. A very good publication on the subject, giving the standard finishes which have proved to have permanency and all other requirements. Complete data are given for producing the finishes.

**Nickel Brightener.** The Lea Mfg. Co., Waterbury, Conn. Leaflet on "Nickel Glo," an addition agent for use as a brightener in nickel solutions, which the makers state will eliminate necessity of polishing, especially adaptable to work which cannot conveniently or economically be buffed. The company has also issued its November Note Book, which contains some finishing information and has room for memorandum, etc., on dated pages.

## Associations and Societies

REPORTS OF THE CURRENT PROCEEDINGS OF THE VARIOUS ORGANIZATIONS

### American Foundrymen's Association

HEADQUARTERS, 222 WEST ADAMS STREET, CHICAGO, ILL.

Convention and Exhibit at Philadelphia

The Thirty-sixth Annual Convention and Exhibit of the American Foundrymen's Association will be held in Philadelphia, May 2 to 6, 1932. All activities will center in the new Municipal Convention Hall, at 34th Street and Vintage Avenue, a completely furnished and equipped convention hall.

There will be provision for adequate exhibit space with unusual facilities, and splendid meeting rooms for all sessions.

Tentative plans for the 1932 program include a number of

practical shop-operation courses and round-table sessions.

For exhibit purposes two large, well-lighted and well-ventilated halls are available in the new convention building. These halls are the Arena or Auditorium, and the Exhibition Hall proper. Complete power facilities are available, including provision for both alternating and direct current, gas, compressed air, hot and cold water and live steam.

Handling of freight and materials in and out of the con-

vention hall will be provided for economically and exceptionally well. A siding of the Pennsylvania Railroad enters the building.

With such facilities available, the American Foundrymen's Association will be in a better position than ever before to successfully co-ordinate all phases of both exhibit and convention sessions. With a broad technical program well under way for papers and reports on interesting and valuable foundry subjects, the 1932 Philadelphia meeting offers exceptional opportunity for a successful and representative convention of the foundry industry.

### Worcester Branch

HEADQUARTERS, CARE OF R. H. BRYANT, 94 GROVE ST., WORCESTER, MASS.

The Worcester Branch, American Electroplaters' Society, will hold a joint meeting with the Worcester chapter of the American Society for Steel Treating, on December 16. The speaker of the evening will be George B. Hogaboom of Hanson-Van Winkle-Munning Company, Matawan, N. J., whose subject will be some phase of Electroplating.

### Philadelphia Branch

HEADQUARTERS, CARE OF J. E. UNDERWOOD, 327 N. 10TH ST., CAMDEN, N. J.

#### Annual Banquet and Session

The Philadelphia Branch, American Electroplaters' Society, held its seventeenth annual educational session and banquet on Saturday, November 21. It was a highly successful affair, with a good attendance and a fine program throughout the afternoon and evening. The educational session was well attended and papers were

presented by several authorities, as listed in these columns in the last issue.

The banquet consisted of the usual fine dinner and some lively entertainment. A number of prizes were distributed and the gathering completely enjoyed itself.

### National Founders Association

HEADQUARTERS, 29 S. LA SALLE ST., CHICAGO, ILL.

The 35th annual convention of the National Founders Association took place at the Hotel Astor, New York, November 18 and 19. There was a good series of sessions on various phases of the foundry business. At the morning session November 18, A. D. Lynch, director of personnel of the Ohio Brass Company gave a talk on "The Modern Trend in Handling People."

### New England Manufacturing Jewelers

HEADQUARTERS, PROVIDENCE BILTMORE HOTEL, PROVIDENCE, R. I.

At a recent special meeting of the board of directors of the New England Manufacturing Jewelers' and Silversmiths' Association, Stephen H. Garner of the Leach & Garner Company, Attleboro, Mass., was unanimously elected president of the association for a third term. During the past year the association, working in conjunction with the merchandising research division of the United States Department of Commerce, has completed a survey of the manufacturing jewelry industry in Providence and the Attleboros. Plans are in hand for a series of meetings to be held under the auspices of the survey committee of the association.

## Personals

### C. W. Curtiss

C. (Carlos) W. Curtiss, who was last month elected president of the Waterbury Clock Company, Waterbury, Conn., has had a long and varied career as executive in many manufacturing lines. He was born in Southington, Conn., fifty years ago, the son of Mr. and Mrs. William L. Curtiss. After attending the local schools and graduating from high school, he worked for a time on his father's farm. His first job, as he tells it himself, was peddling vegetables in Waterbury. Although he has since been in many industries, he was not again engaged in any business in Waterbury until he came there last month to head the clock company.



C. W. CURTISS

On leaving the farm he became associated with John Alvord, head of the Torrington Company, first in a clerical capacity, then as a salesman, assistant manager, and finally branch manager. At different times during the seventeen years he was with the concern he was president of seven of its subsidiary companies, and he was one of Mr. Alvord's chief executives.

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he was president of seven of its subsidiary companies, and he was one of Mr. Alvord's chief executives.

After leaving the Torrington Company he went with John N. Willys, the automobile manufacturer, and became president and general manager of one of his plants, the Van Sicklen Speedometer Company. Mr. Curtiss negotiated the sale of this concern to the Stewart-Warner Corporation, and then organized and financed the Tiffany Manufacturing Company of Newark, N. J., makers of automobile instruments and accessories. He later sold this to Vincent Bendix, the aviation corporation official. He then became vice-president and general manager of one of Mr. Bendix's companies, the Commercial Instrument Corporation, and later president and general manager of another of his companies, the Connecticut Telephone and Electric Corporation. He later sold his interest and retired for a few years. It was while he was in retirement that he was called upon to become president of the Waterbury Clock Company.

He is married. He is a member of the Union League Club of New York, the Detroit Athletic Club, and the Newark Athletic Club.

W. R. B.

### B. H. Divine Back from Europe

Marked contrast in the methods of doing business in Europe as compared with American business transactions was noted by Bradford H. Divine, president of Divine Brothers Company, Utica, N. Y., manufacturers of metal finishing equipment, who has just completed a two-month trip in France and England, where he said products manufactured by his concern have received a cordial reception. He met the leading metal manufacturers in both countries.

"French and English business men are not as blatant in making claims for their products as Americans are prone to be," he said. "In my contacts in France and Brussels I noted an agreeable lack of the display of egotism common on this side."

An automatic machine for polishing bumpers was installed

in the Citroen Company factory in France by the Divine company. This machine polishes a bumper in a minute and a quarter, as compared with 30 minutes previously required for the operation. Divine Brothers also placed one of these machines in the Renault factory.

"The French are keen for modern practice," Mr. Divine said. "In the Citroen plant American tools are used. About 15,000 men are employed, turning out from 250 to 400 cars a day."

The Utica manufacturer said French automobile makers take a great deal more pains in turning out a machine than the American makers. This can be done, he said, because of the lower wage scale in France. Within a few months a group of automobile engineers from France will visit the Divine plant at Utica to place more orders.

The Utican found Sheffield, England, has suffered intensely from the depression. He talked with executives of Thomas Firth & Son, stainless steel makers. Sheffield manufacturers, he said, plan to restore the supremacy of Sheffield goods by adopting American methods and reducing costs. E. K. B.

**Robert J. Piersol** is now physicist with the Geological Survey of the State of Illinois, and is located at Urbana. Mr. Piersol was a consulting engineer specializing on chromium plating.

**Frank E. Bartley** is now on the selling force of the Bridgeport Safety Emery Wheel Company, Bridgeport, Conn. Mr. Bartley was connected with the Blanchard Machine Company for a number of years.

**Charles H. Proctor**, for many years with The Roessler and Hasslacher Chemical Company, New York, will retire from active service with the company on December 31, 1931. Mr. Proctor will thereafter become consultant to the company's technical service department.

**Herman A. Bartholomaei** has been appointed to take charge of the eastern New York and western Massachusetts territory for the Paasche Airbrush Co., Chicago, Ill. Headquarters will be maintained at Pittsfield, Mass.

**Dr. Paul D. Merica**, past chairman of the Institute of Metals Division, has been elected to the Board of Directors of the American Institute of Mining and Metallurgical Engineers. Dr. Merica is assistant to the president of the International Nickel Company, New York, and is widely known for his work in the development of nickel alloys and other metallurgical lines.

**G. H. Bangs** has been appointed purchasing agent and sales manager of the Nassau Smelting & Refining Co., Inc., Tottenville, Staten Island, N. Y., which is a new subsidiary of Western Electric Co., formed through acquisition of the former Nassau company and two other scrap metal smelting concerns. Executive sales and purchasing offices are at 50 Church Street, New York.

**Ray G. White** is now Eastern sales representative of the Electric Furnace Company, Salem, Ohio. Mr. White was formerly with the Mahr Manufacturing Company and has had over 10 years' experience in the industrial furnace field. He will have charge of both electric and fuel furnace sales in northwestern Pennsylvania, eastern New York, and the New England States, with headquarters at 55 West 42nd Street, New York City.

**Richard O. Bailey** announces that he has opened an electroplating consulting laboratory at 481 Bourse Building, Philadelphia, Pa. He will specialize in consultation, analysis and investigation for platers and the plating industry. Mr. Bailey states he is a graduate chemist with about 15 years' experience in the electroplating field, both in the plating room and in the control laboratory, as a research investigator in various lines of electroplating.

## Obituaries

### Wendell B. Folsom



W. B. FOLSOM

Wendell Bert Folsom, president of the Exeter Brass Works, Exeter, N. H., died recently at Wallingford, Vt., while there on a motor trip. Mr. Folsom was 68 years old.

Wendell Folsom was born at Exeter in 1864, the son of Eben Folsom who founded the brass works at Exeter in 1865. Wendell Folsom was actively engaged in the management of the plant for about 35 years. He was also interested in a number of other business and industrial enterprises.

### A. C. Goldman

A. C. Goldman, vice-president of the Sterling Brass Company, Cleveland, Ohio, died October 13, at Erie, Pa., as the result of an automobile accident. He was 53 years of age.

### Robert Crawford

Robert Crawford, president of the Atlas Foundry Company, Detroit, Mich., died last month after an attack of pneumonia, following an illness of several weeks. He was 58 years old. He was born in Scotland and came to the United States in 1892, making his home first in Seattle, Wash. Several years later he came to Detroit to work as a moulder. Fifteen years ago he became president of the Atlas Foundry Company.

F. J. H.

### James E. Evans

James E. Evans of S. Obermayer Company, Chicago, Ill., died recently after a brief illness. Mr. Evans was connected with the Obermayer Company for almost 40 years, and was especially well known in the Chicago territory where he represented the company for a considerable time.

### Elmer W. Deved

Elmer W. Deved, assistant superintendent of production at the Yale and Towne Works, Stamford, Conn., and with the company for nearly 34 years, died suddenly of a heart attack on October 27, 1931.

### Robert Wise

Robert Wise, president and treasurer of the Buckeye Products Company, foundry supply manufacturer, Cincinnati, Ohio, died recently there. He was 54 years old.



# News of the Industry

## Industrial and Financial Events

### McAleer Company of Canada

C. H. McAleer, president, McAleer Manufacturing Company, Detroit, Mich., announces the incorporation of the McAleer Manufacturing Company, Ltd., of Canada, with plant to be located at the corner of Victoria and Sandwich streets, Walkerville, Ont. This will be a distinctly Canadian organization, purchasing all raw materials, supplies and other commodities at Canadian sources, and employing Canadian workmen. Sales headquarters of the company's automotive products to the jobbing trade will be centered in Toronto, under the direction of Arthur Kinzinger, 210 Dundas street, Toronto. Other divisions of the sales staff will operate from the home office in Walkerville. The company will produce the full McAleer line of automobile polishes and metal polishing and finishing compositions and compounds.

Officers of the new company are C. H. McAleer, president and treasurer; R. M. Buckingham, vice-president and secretary. The directors, in addition to Mr. McAleer and Mr. Buckingham, are E. D. McAleer, H. L. Dresser and S. S. Dickinson.

### Simplified Practice for Abrasives

The division of simplified practice of the United States Bureau of Standards has announced that simplified practice recommendation R118-30, on abrasive grain sizes, has been reaffirmed by the standing committee of the industry, without change, for another year. This recommendation establishes a table of allowable limits for the sizing of aluminum oxide and silicon carbide abrasives for polishing uses, and for grinding wheel manufacture.

At their recent meeting, the producers of abrasive grains adopted a resolution stating the desirability of identifying the grain made in accordance with the simplified practice recommendation. The following phrase was selected by them as the proper and only one to be used: "This abrasive has been made to comply with simplified practice recommendation R118-30, issued by the U. S. Department of Commerce."

### Winchester Arms Company to Be Sold

Properties of Winchester Repeating Arms Company will be sold at New Haven, Conn., December 15th, under the terms of a foreclosure decree signed last month by Judge Carroll C. Hincks in United States District Court. The upset price for all the assets of the company was fixed at \$4,000,000. It is expected that the properties will be bid in by the reorganization committee, consisting of Medley G. B. Whelpley and Earle Bailie, who have formulated a plan contemplating the sale of the assets of the company to Western Cartridge Company.

### Tariff on Candlesticks, Etc.

Candlesticks, candelabra and jardinières imported into the United States will hereafter be assessed under Paragraph 397 of the 1930 Tariff law as manufactures of metal, dutiable at 45 per cent ad valorem, according to a decision announced by the United States Treasury Department on November 4.

### Walworth Company's Orders Larger

Howard Cooley, president of Walworth Company, Boston, Mass., manufacturers of valves, pipe fittings and allied products, in a report to stockholders, said in part: "The third quarter showed a substantial loss, but not as great as either of the previous quarters of the year."

"We are glad to report that since the latter part of September,

our orders have increased at the rate of 20 per cent over the third quarter, and prices have stabilized on a better average basis than in the third quarter.

"Although our business is still far from normal, there is a better sentiment among our customers and the fourth quarter should show improvement over the third quarter."

### Brass Ingot Deliveries

The combined deliveries of brass and bronze ingots and billets by the members of the Non-Ferrous Ingot Metal Institute, Chicago, Ill., for the month of October, 1931, amounted to a total of 3,502 tons, according to announcement made by the Institute.

### Rome Company Expands Line

Rome Manufacturing Company, Rome, N. Y., has expanded its line of output to include polished copper kitchen utensils made of 99.9 per cent pure copper. The line includes kettles, pans and skillets retailing within a range of 75c. to \$3.75.

### Corporation Reports

**Parker Rust Proof Company**—Nine months ended Sept. 30: Profit after depreciation and other charges, but before Federal taxes, \$485,859, compared with \$436,326 in first nine months of 1930.

**Anaconda Wire and Cable Company**—Three months ended Sept. 30: Net loss after charges, depreciation and taxes \$50,061, against net profit of \$118,228, equal to 28 cents a share on 422,470 shares of capital stock, in preceding quarter and net profit of \$8,701, or 2 cents a share, in third quarter last year. Nine months ended Sept. 30: Net profit \$229,632, or 54 cents a share, compared with \$200,423, or 47 cents a share, in first nine months of 1930.

Following a precedent which large corporations established at the time of the World War, the **National Lead Company**, a \$100,000,000 corporation, last month declared an "emergency relief dividend" of 25 cents a share on its common stock in addition to the regular quarterly dividend of \$1.25 a share. E. J. Cornish, president, announced that the extra dividend checks would be accompanied by a request to stockholders to recognize their obligation to contribute to unemployment relief funds.

**New Jersey Zinc Company** reports for the quarter ended Sept. 30, net profit of \$778,817 after taxes, depreciation and depletion, etc., against \$1,050,880 in 1930 period. In nine months net profit was \$2,504,838, against \$4,140,036 in corresponding period of 1930.

Net profit of the **International Nickel Company of Canada, Ltd.**, for the quarter ended on Sept. 30 amounted to \$645,970 after taxes, depreciation, depletion and other reserves. This is equal after preferred dividends to 1 cent a share on the common stock and compares with \$1,700,248, or 8 cents a share, in the previous quarter and with \$2,013,961, or 10 cents a share, in the third quarter of last year.

**Revere Copper and Brass, Inc.**—Nine months ended Sept. 30: Net loss after interest, depreciation and other charges, \$639,496, compared with net profit of \$668,379 in same period last year after above charges but before inventory adjustment of \$2,000,000 and surplus deductions against inventories of \$400,000.

**Yale & Towne Manufacturing Company**—Nine months ended Sept. 30: Net loss after depreciation and reserve for taxes, \$276,168, against net profit of \$144,602, or 30 cents a share on 486,656 shares last year.

## Developments in Metals

COPPER, BRASS AND BRONZE were used extensively in the new building for the Department of Commerce at Washington, D. C. About 2,000,000 pounds of these metals were put into the building.

COPPER HOUSES manufactured by Hirsch Kupfer & Messingwerke of Berlin, Germany, were featured at the International Building Exposition at Berlin this year. Sectional walls manufactured by machinery are used, and these can be assembled into a complete house in 24 hours by six men, it is reported.

"INCO CHROME NICKEL" is a new alloy developed by International Nickel Company for use of the dairy industry. Advantages are said to be high strength and resistance to corrosion and tarnish, combined with facility for manufacture.

CORROSION-PROOFING of structural steel is the purpose of a new process introduced recently by Dr. Colin G. Fink, noted authority on electrochemistry. The process is said to involve the use of a continuous flow of current through the steel, which is said to be unable to corrode while charged with the current.

ALUMINUM ALLOY interurban cars will be built by J. G. Brill Co., Philadelphia, Pa., for the Fonda, Johnstown & Gloversville R. R. Co., for use between Schenectady and Gloversville, N. Y.

ALUMINUM was being considered recently for lining and ornamenting steel structures at grade crossings in Syracuse, N. Y., to supplant stone and other materials hitherto usually used for the purpose.

LEAD-SHEATHED resistance wires are being used to heat the soil in hotbeds and greenhouse benches, to enhance germination of seeds.

ALUMINUM FOIL has been found highly effective as a wrapping for butter, according to tests by the Aluminum Company of America. Aluminum-wrapped butter was kept for six weeks in refrigerated storage and emerged in better condition than butter

wrapped in the ordinary manner and kept for the same period in the same place.

LEAD used for plates, terminals and other parts of electric storage batteries for automobiles in 1930 amounted to about 157,000 tons.

ALUMINUM used for oil lease tanks is the subject of a series of reports recently issued by the United States Bureau of Mines.

ST. LOUIS continues as a leading center of church bell production, with an annual production valued at about \$50,000, a news report states. Rural demand for church bells continues steady, but city business is falling off, it is stated.

ZINC is being considered for automobile license plates by the State of New Jersey, it is reported. Similar ideas are entertained in Missouri, Kansas and Oklahoma, it is stated; those states are also large zinc producers.

## Business Troubles

Capital City Plating Works, Inc., 761 Broadway, Albany, N. Y., has filed a voluntary petition in bankruptcy in Federal Court, Utica, N. Y., listing assets of \$2,364 and liabilities of \$15,295.

Midwest Stove & Enameling Co., Bellville, Ill., is in receivership, with Elmer Frees, former president, and George Baker, former president of Baker Stove Works, as receivers. Indebtedness of the firm is estimated at \$100,000.

American Metal Spinning & Welding Co., 682 South Eleventh Street, Newark, N. J., was ordered last month to show cause why a receiver should not be appointed. Edward King, treasurer of the concern, charges that the company, incorporated August 28 last, now is insolvent and that there is dissension among its officers.

# Business Reports of The Metal Industry Correspondents

## New England States

### Waterbury, Connecticut

DECEMBER 1, 1931.

Another step in the reorganization of the Waterbury Clock Co., following the election of C. W. Curtiss as president and the election of the former president, Irving H. Chase, as chairman of the board of directors, was taken last month when William M. White was elected treasurer, a position also formerly held by Mr. Chase. Mr. White was formerly an official of the old New England Watch Co., later acquired by the Ingersoll Watch Co., which was taken over by the Waterbury Clock Co., a few years ago. He is a son-in-law of Mrs. H. L. Wade, whose late husband was president of the Waterbury Clock Co. for many years. Mrs. Wade is owner of a large block of stock in the clock company.

W. R. Hibbard of this city, an expert in the technical department of the American Brass Company, and prominent in national engineering circles, was one of the speakers at the three-day conference on metals and alloys held at the Case School of Applied Science in Cleveland last month. He addressed a group of 500 engineers on "Brass, Bronze and Copper Alloys."

Edward O. Goss, president, Scovill Mfg. Co., has been elected a director from Connecticut of the National Association of Manufacturers for 1932.

John H. Goss, vice-president of Scovill Mfg. Co., has been reelected vice-president of the Connecticut Manufacturers' Association.

In the eight largest factories here 13,845 persons were employed during October, a decrease of 353 compared with the previous month. In all the factories there was a decrease of 53 compared with the previous month. However, the electric current consumed was 693,209 KWH more than in October, 1930, and 1,953,973 KWH above September, 1931.

George Sengstacken has been elected president of the Chase Foremen's Association, succeeding Robert Waters.

Arthur W. Tracy, a member of the technical department of the American Brass Co. corrosion research laboratory, and an authority on outdoor exposure tests, gave an address on plating problems at the meeting of the Waterbury Branch of the American Electroplaters Society last month. He has done considerable work for the American Society for Testing Materials on their corrosion tests.

Patents granted local inventors last month included the following: To George A. King of the Scoville Mfg. Co., tack fastened stud for snap fasteners; Joseph Dews of the same concern, floating spring type fastener; Ernest D. Simons, pearl cap snap fastener socket; Paul Fenton, snap fastener, assigned to the Scovill Mfg. Co.; William Colina, hub cap; Daniel F. Dalton, fastening device; Peter B. Reeves, musical hour-striking clock; Richard L. Wilcox, trimming blanks and method for making screw blanks; Joseph R. Wolff, hub cap.

W. R. B.

## Connecticut Notes

DECEMBER 1, 1931.

NEW HAVEN—Directors of the Winchester Arms Co. have called a special meeting of the stockholders for Dec. 2, to act on a proposal to terminate the existence of the corporation. A foreclosure decree to sell the company on Dec. 15 has been issued by Judge C. C. Hincks of the United States Court. Western Cartridge Co. is to buy it at a price said to be \$3,000,000 in cash and \$4,800,000 in preferred stock, besides contributing \$300,000 for receivership and reorganization expenses. Holders of Winchester first mortgage 7½ percent bonds will receive \$50 in cash and \$28 par value of



Western Cartridge preferred stock for each \$100 principal amount of bonds held. Holders of the 6½ percent debentures and other unsecured claims will receive \$38 par value Western Cartridge preferred for each \$100 principal amount of debentures or allowed claims.

F. W. Olin, president of Western Cartridge, secured from the municipal board of relief a reduction in the tax assessment of the Winchester company amounting \$4,601,305, about half the original assessment. It was made when the city was assured that the new owners will continue operation of the plant and prevent 4,000 additional unemployed being added to the city's list. The Winchester company has also just received from the Bureau of Internal Revenue a refund of taxes amounting to \$199,698, due to an over-assessment on its 1918 income.

**HARTFORD**—President Edward R. Grier of the Arrow-Hart & Hegemen Electric Co. has announced a plan to aid former and present employees of the company. Employees and company will contribute equally to a fund to be administered by the employees. The employees' contributions will be a percentage of their wages. The money will be used for relief of employees and those laid off because of the depression. The plan was accepted by the employees, 1,609 to 7.

A somewhat similar plan has been adopted by the Carling Tool & Machine Co. For every dollar contributed by the employees the firm will contribute a dollar. The employees will give as they see fit rather than a fixed percentage of their wages.

Underwood Elliott Fisher Co. has declared a dividend of 75 cents a share on common, and regular quarterly dividend of \$1.75 on preferred, payable Dec. 31 to stock of record Dec. 12. This places the common on a \$3 annual basis, compared with the \$4 rate established three months ago, and the \$5 previously paid.

England's new anti-dumping measure may affect the city's typewriter industry. E. C. Faustmann, president of the Royal Typewriter Co., thinks. Royal typewriters are sold in England by the Visible Writing Machine Co. George W. Campbell, works manager of the Underwood Elliott Fisher Co., expresses the opinion that the measure will not affect the sales of his concern.

**BRIDGEPORT**—The Holmes & Edwards division of the International Silver Co. has been closed, and the work and machinery are being moved to the plants in Meriden and Waterbury.

Bryant Electric Co., owned by Westinghouse, has increased working hours in various departments, operating some overtime, to keep up with production requirements.

**TORRINGTON**—The Torrington Co. has acquired the H. Lydall & Foulds manufacturing plant at Manchester, Conn., and plans to move the shop equipment to this city about Jan. 1. In the meantime employees in the local plant are learning the operation of machines moved in for that purpose. As a result, the Manchester plant is now operating overtime.

The Fitzgerald Mfg. Co. is now doing a good business. It has 600 factory workers and 60 office employees at its local plant, and 200 at its branch in Winsted. Electrical goods and automobile accessories are the principal output, particularly gaskets for every standard make of automobiles.

**MERIDEN**—The International Silver Co.'s position is expected to improve due to the upturn in silver prices. It is reported to be carrying an inventory of between \$6,000,000 and \$7,000,000 which will be favorably affected by this rise. The company reported a net loss of \$148,578 for the September quarter, after depreciation charges.

**WINSTED**—Robert L. Noble, manager of the Strand & Sweet branch of the Polymet Mfg. Co., has received word from the New York office to close the plant for one week. It has been running on a small scale for two years. It is thought the shut down will be for longer than one week.

Winsted Insulated Wire Co., Inc., which was recently organized and took over the plant and equipment of the old Winsted Insulated Wire Co., which went into receivership, has received a large order and started operations. The nature of the work is such that skilled operators are required 24 hours daily. For the past two months machinery and equipment has been overhauled and repaired.

**NORWALK**—Segal Lock & Hardware Co. has liquidated its bank indebtedness of \$560,000 according to President Segal.

**NAUGATUCK**—Risdon Mfg. Co. has concluded negotiations with Melchoir, Armstrong, Dessau Co. of New York to handle the export business of the company's new line of motion picture cameras.

**SOUTHINGTON**—Southington Hardware Co. stockholders received a dividend at the rate of 35 cents a share last month. The rate for the previous quarter was 50 cents.

**MIDDLETOWN**—Middletown Silver Co. has increased its working force and hours. It is three weeks behind in its deliveries. In response to popular demand it is stressing the manufacture of pewter ware as well as silver.

**BRISTOL**—Edward Ingraham, president of E. Ingraham & Co., watch and clock manufacturers, was elected a director of the Connecticut Manufacturers' Association last month.

**HAMDEN**—The plant and equipment of the Mt. Carmel Mfg. Co. has been bought by John Heidtman, who will move the business to Deep River and carry it on there. Toy airplanes and other novelties will be manufactured.—W. R. B.

## Middle Atlantic States

### Central New York

DECEMBER 1, 1931.

Manufacture of new products, or products new to them, is being tried by industries in this area as business men strive to keep pace with modern times and scheme to keep employees at their benches. The most recent example here is the Brunner Manufacturing Company, Utica, maker of compressors for the past 26 years, which is starting to make a line of electric refrigerators. The concern has used a considerable amount of copper and non-ferrous metal in late years, and in making the refrigeration units will use more. The company, which has a world-wide reputation for precision engineering, with customers and dealers in 68 countries, is putting into production a line of five refrigerator models ranging in price from \$180 to \$410 f. o. b. factory, to be marketed under the name "Brunner."

Utica Brass Works is preparing to manufacture a low-priced fire extinguisher. The company plans a 1½ gallon model for home use which, it is claimed, can be operated by a child or woman. Orders are now being taken for delivery

early in 1932. Additional help is to be taken on to make the product. Clarence Adams and Myron Link will have charge of manufacturing. The present business in making lighting fixtures, plating, and repairing will be continued.

Flames of undetermined origin destroyed the Camden Wire Company's building at Camden, N. Y., on Nov. 21, causing damage estimated at more than \$50,000. The blaze started in the tinning room. Stockholders have no definite plans for the future, although the concern has a number of orders under contract which they must get out. A. H. Maloney, Camden, is president. The company has been engaged in manufacturing automotive, radio and electrical supplies.

Edward D. Ibbotson, president of Horrocks-Ibbotson Company, fishing tackle and sportsmen's supplies, Utica, has been elected a director of the Citizens Casualty Insurance Company of New York.

William D. Jones, Rome, employe of the Rome Wire Division of the General Cable Corporation, was awarded about \$3,000 for the loss of his left eye in compensation court in Rome recently.



**Alfred R. Redner**, 1005 Green Street, Utica, foreman in the maintenance department of the **Bossert Corporation**, makers of metal parts, died last week in Faxton Hospital after he was taken sick suddenly while at work.

Members of the Copper City Club, meeting at Stanwix Hall in Rome on the evening of Nov. 18, received information relative to the **General Cable Corporation** and copper products made by this concern, from **Glenn Rawlston**, electrical engineer for the corporation. He was accompanied by his assistant, **John Reifert**, guest of the club. **Dewey Infanger**, another representative of the corporation, also spoke. Mr. Rawlston said the Rome concern has been awarded a contract by the United States government for the equipping of 650 airships with the Rome molded ignition manifolds.

**Remington Rand Company** will in future operate according to a modification of the General Motors plan adapted to its needs, according to a statement of **James H. Rand, Jr.**, board chairman and president. Improvement is reported in the November sales. Domestic business for the first half of November was 15 per cent greater than for the first half of October. Normally November gross sales are 4 per cent below the October figure, plant officials said. Improvement is reported in all branches of the company's domestic business, while foreign dealers' sales have also shown an increase. Many Remington salesmen and service men will continue with the **National Cash Register Company**, Dayton, O., which is taking over the physical assets of the **Remington Cash Register Company**, it is reported.

E. K. B.

### Newark, New Jersey

DECEMBER 1, 1931.

Vice-Chancellor Church has dismissed a suit brought by **George S. DePuy**, a stockholder and creditor, to have the **Standard Combustion Corporation**, manufacturers of oil burners, at 205 Central Avenue, placed in receivership. DePuy claims the concern is unable to pay loans by officers totaling \$138,650. It was explained by the concern that officers had accepted preferred stock for that sum and discharged the liability against the company. The court also was told current assets are seven times as great as liabilities, and the company is so far behind in orders it is seeking a larger factory.

**William H. Whitney** has been appointed receiver for **William Tries Sons**, 1046 Springfield Avenue, after the filing of voluntary petition by Tries. The concern has been in the hardware business in Newark and Irvington for forty years.

Reorganization of the company is under way. Assets were placed at \$50,000 and liabilities in excess of that sum.

**Stevens Manufacturing Corporation**, makers of radio parts, 48 Spring Street, has been placed in the hands of **Samuel Nelson** as receiver by Vice-Chancellor Church. Application for a receiver was made by C. Wallace Vail in behalf of two creditors, charging the defendant had liabilities in excess of \$53,000, as against assets of between \$30,000 and \$40,000.

Following Newark concerns have been incorporated: **Adams Nickel Plating Company, Inc.**, plating of metals, \$125,000. **Plastic Metals Corporation**, \$125,000. **Metal Compounds Corporation**, metal goods, 100 shares no par. **Ace Welding Boiler Repair Corp.**, mfg. metal products, \$125,000. **Alloy Fabricators, Inc.**, metals and chemicals, 100 shares. **Majestic Electric Clock Co., Inc.**, manufacture clocks, \$15,000 preferred and 150 shares common. **Duravalue, Inc.**, metal castings and valves, 5,000 shares common.

C. A. L.

### Trenton, New Jersey

DECEMBER 1, 1931.

Business remains only fair at some of the Trenton industrial plants, and the factories are operating but part time. **Jordan L. Mott Company**, which has twice been in the hands of receivers within the past few years, is now closed down. It is not known whether the plant will be opened again. The big plant was one of the most successful in this city for many years, until it met with reverses. Following the first receivership the concern was put into good shape again, but the present depression has hit it very hard. All the hands have been paid off and dismissed.

**Allan A. Jones** of Trenton has secured a patent on an invention which secures bearings in place by reason of friction contraction. He has assigned his invention to the **Roller Bearing Company of America**, Trenton.

**Dudley Willcox**, Lawrenceville, N. J., has secured a patent on improvements in an electric induction furnace which embrace six original features. The device is for use in connection with a cooling system for furnace coils, and provides an inductor and water cooled tabs at intervals on the outside of the inductor adapted to cool the inductor and protected from the furnace charge by the body of the inductor, the patent office explains.

Following concerns have been incorporated at Trenton: **March Chemical Co.**, chemicals, \$100,000, Metuchen. **D. V. G. Chemical Corp.**, 100 shares, Hoboken.

C. A. L.

## Middle Western States

### Detroit, Michigan

DECEMBER 1, 1931.

Although industrial conditions in this area have changed little during the past month, there is a better feeling regarding the future. Everyone now seems to be hopeful as to the next year, and is thinking about inventory and cleaning up for a new start. The motor car companies are announcing new models, but they are not yet in extensive production. In fact, they are doing little more than they were a month ago. After the first of the year, however, everything points to better things, although no one is anticipating an early return to normal business.

The non-ferrous metal plants already are making preparations for more activity after the holiday season has passed. A few are operating moderately at the present time, but production in general is light.

Plating plants are still quiet, and not much is expected from them until after the first of the year.

Manufacturers of plumbing and steam fitting supplies are simply marking time. At present there is nothing particularly promising in sight.

Manufacturing jewelers have been on curtailed production schedules for many months, and it is difficult to forecast the future for anything that pertains to luxuries.

**International Metal Products, Inc.**, 512 Capital Bank Tower, Lansing, was recently chartered under the laws of Michigan, to deal in metals and metal products; capital stock is \$10,000 and the owners are William P. Reilly, Tom Banville and Malcolm T. Faulkner.

Installation of line production machinery has been completed at the Detroit plant of the **Evans Appliance Co.**, and production of gasoline, oil and water pumps for internal combustion engines is already under way, according to **L. A. Blackburn**, president. The beginning of production, which terminates a long period of experimental work, follows the receipt of substantial orders, it is stated.

October sales of the **Norge Corporation**, manufacturers of refrigeration units, are reported at 892 per cent over October, 1930, while sales for the year to date are approximately 533 per cent ahead of last year, according to John H. Knapp, vice-president and director of sales. With the holiday buying now under way, he says, Norge sales should outstrip all previous records for annual volume.

The fall business of the **Long Manufacturing Co.**, Detroit, has shown a steady increase, according to executives of that organization. This concern makes clutches and radiators that are used as standard equipment on leading makes of motor

cars. This increase is attributed to new contracts and contract renewals.

**Chromium Plating Corp.**, Jackson, Mich., is operating its plant at capacity, and expects to continue full operations through the winter, according to **George A. Barrow**, president.

Saginaw foundry plant of the **Chevrolet Motor Car Co.**, is employing 3,200 men on casting work for new model cars. The men are working in three eight-hour shifts three and four days a week.

**Federal Mogul Corp.**, Detroit, recently began the production of propeller wheels, it is announced.

**Sparks-Withington Co.**, Jackson, is preparing to manufacture electric refrigerators, it is announced. Production will be started about Jan. 1.

Steady increase in production at the plant of the **Leonard Refrigerator Co.**, Grand Rapids, which is bringing out several new models, will result in a substantial re-employment of labor, during the next two or three months, according to **Frank Brebner**, factory manager.

**Michigan Platers and Polishers Supply Co., Inc.**, Benton Harbor, has recently been chartered under the laws of Michigan. The owners are **J. D. Morris**, **Sol Morris** and **Joe S. Caplan**.

F. J. H.

### Cleveland, Ohio

DECEMBER 1, 1931.

One of the most important industries on which Cleveland and northern Ohio relies, the manufacture of automobile accessories, is about to swing into production; not booming, of course, but sufficient to make every one feel more optimistic. With many automobile makers now bringing out their new models, January 1 production will be accelerated in the automobile plants in the neighboring city of Detroit. This, of course, means accessory orders for hundreds of thousands of dollars worth of materials to be purchased from manufacturers in northern Ohio.

One Cleveland maker of automobile parts reports unfilled orders almost double those of a month ago. Another parts maker reports orders sufficient to keep his plant at capacity production until January 1.

Along with a brightening industrial picture, banks in 27 counties of Ohio have completed the financing of their share in the National Credit Corporation's \$500,000,000 fund for the relief of frozen assets. Banks in these 27 counties, operating through the Cleveland Clearing House, subscribed the full quota assigned, \$9,110,000. A committee of Cleveland bankers has been appointed to supervise the loans out of the fund in this section of Ohio.

F. J. H.

### Toledo, Ohio

DECEMBER 1, 1931.

Toledo, which has been laboring under a handicap for several months due to the sudden collapse of four of its largest banks, is now seeing light once more. At least a portion of the millions tied up probably will be released shortly, following a banking re-organization that is now about completed.

Many of the large manufacturing plants had their funds suddenly tied up, and at one time found it difficult to keep things going. Even with brighter financial prospects ahead, production in the non-ferrous metal plants is at a low ebb. No substantial improvement is expected until after the first of the year. It is believed that things will start going better soon after the new year, with so many of the motor car manufacturers planning for an early resumption of spring production. But there will be no rush. The improvement is expected to be gradual as the season advances.

**Chevrolet Motor Co. of Ohio**, after a temporary shutdown for repairs, has re-opened its Central Avenue plant, recalling 1,500 workers, including both night and day crews. Indications are that the force will be maintained throughout the winter, according to executives.

**Willys-Overland Company** has again increased its schedule because of increased car sales which followed price cuts made by regional distributors.

F. J. H.

### Wisconsin Notes

DECEMBER 1, 1931.

One of the biggest recent consignments of bronze castings from Milwaukee was shipped late in October by **Ampco Metal, Inc.** The castings are to be used as forming dies by the Baldwin-Southwark Corporation, Philadelphia, in the production of 16 inch diameter pipe for the oil fields. The shipment weighed almost 18,000 pounds.

A voluntary resolution was passed by a group of Wisconsin manufacturers who met Oct. 30 with Gov. Phil LaFollette in Madison, stating that wherever feasible hours would be reduced in an effort to put a larger number of men to work. Among manufacturers attending the meeting was **B. C. Ziegler** of the **West Bend Aluminum Co.**, West Bend.

Optimism is increasing, **George Vits**, president of the **Aluminum Goods Manufacturing Co.**, Manitowoc, stated at the time of his appearance at the annual meeting of the Wisconsin Manufacturers' Association in Milwaukee, Nov. 17.

A. P. N.

## Other Countries

### Birmingham, England

NOVEMBER 20, 1931.

Evidences of improvement in trade have been noticeable in this district ever since Britain went off the gold standard. The decline in unemployment in Birmingham has been steady for six weeks, and no less than 7,000 persons have been re-absorbed into the factories. The metal trades are among those which have felt the effect of this awakening. Brass founders have noticed a big improvement in the last month, both in home and export trade. At home there is a feeling of confidence which has been brought about by the return of a strong National government to power, and a great many manufacturers are expecting that the government's decision to impose tariffs will prevent the dumping of goods which has been such a serious matter for British manufacturers for a long period. Customers at home who use builders and cabinet brassfoundry are ordering in slightly larger quantities, whereas before the Election they only bought materials for immediate use, and that on a very meagre scale. Stocks are low everywhere, and there is more readiness to place business. Several schemes that were shelved for a time are now coming forward again. Auto accessories are more active.

A slight upward movement in prices has accompanied the expansion of trade, but the cost of brass and copper is still regarded as very reasonable. Values had sunk very low—down to fourpence a pound for brass rods. Makers of gas and electric fittings are also better employed.

The Cold Rolled Brass and Copper Association reduced the basis price of rolled copper £3 a ton early last month, making it £72, and the price of rolled brass by a farthing per pound, making brass strip 7½d per lb. There was no drop in the price of new metals. The position of the market, in fact, is rather firmer, but the authority which fixes the prices considers that the position is now more stable, and there is no need for the comparatively high figures which were fixed some time ago to discourage speculative contracts.

Another feature of the metal market is that Germany is said to be buying a good deal of British scrap. This is possible because of the rate of exchange. It is a curious feature that while finished material has gone up a halfpenny a pound, scrap has also gone up by the same amount, which of course is out of proportion.

The threat of a tariff has brought a rush of Continental imports, and at various centers large tonnages have been



landed so as to be in England in case of an import duty being imposed.

The volume of business in the aluminum hollow-ware trade is very much improved, and a firm at Wolverhampton has found it necessary to open an additional factory. This is the **Midland Metal Spinning Co., Ltd.**, which is a well known concern equipped for mass production of stampings. They are now using about three acres of space all equipped with modern machinery. Business has improved greatly in the last few weeks. Day and night shifts are being worked, and fresh hands have been taken on. It has been impossible to obtain immediately all the skilled labor necessary in the polishing

and spinning departments, and the company has decided to train unskilled operatives in the work. Home trade has been better and orders are even coming from the Continent which hitherto has been a big competitor. This, of course, is due to the withdrawal from the gold standard. Aluminum hollow-ware is being sent to South Africa, the West Indies, and a little to the Far East. Even New Zealand, which has long been an unapproachable market, is sending in a few inquiries and orders. Judging by the business prospects in Africa, it is evident that trade with that country is improving considerably.

J. A. H.

## Business Items — Verified

**Lee Bowman**, California inventor of the "Dawn" aviation motor, is considering establishment of a plant at Dallas, Texas.

**Slate Aircraft Corp.**, Glendale, Calif., is considering establishment of a plant for manufacture of all-metal dirigible aircraft at Dallas, Texas.

**General Plating Company**, Canton, Ohio, job platers, has moved to its new plant at 516 McGregor Avenue, N. W. Considerable new equipment has been installed.

**The Duriron Company, Inc.**, Dayton, Ohio, manufacturers of acid-resistant metals, has appointed **H. P. Rodgers** as their representative for the Cleveland territory. Offices are located at 528 Leader Building.

**Amesbury Brass and Foundry Company**, Amesbury, Mass., reports increased business, with plant operating overtime to 11:30 p. m. three nights a week. Company produces refrigeration equipment, etc.

**Barnard and Hammond Company**, Ann Arbor, Mich., polishers and platers, have added a small night shift to take care of increased business. The company does plating and polishing on a production basis.

**Aluminum Industries, Inc.**, has opened a new branch at 431 Peachtree Street, Atlanta, Ga., from which the entire line of its finished products manufactured at Cincinnati, Ohio, and St. Cloud, Minn., will be marketed.

**Metal Package Corporation**, manufacturers of cans, etc., have leased space in Chicago, Ill., for a plant which will employ 200 men. Company is a subsidiary of McKeesport Tin Plate Company, McKeesport, Pa.

**Niagara Falls Smelting and Refining Corporation**, 2208 Elmwood Avenue, Buffalo, N. Y., announces the completion of its new chemical and physical laboratories and research department, devoted exclusively to metals and alloys.

**Walter Schoenbach**, for many years prominent in the white metal trade, has organized the **Walter Schoenbach Corporation** with offices in Room 229, First National Bank Building, East Chicago, Ind. The company will purchase battery plates and distribute white metal products.

**United Engineering and Foundry Company**, Pittsburgh, Pa., announces that since the introduction of the four-high method of rolling steel and nonferrous metals, it has supplied equipment for this process to 50 plants. Twelve plants are using four-high mills for rolling nonferrous metals.

**Langenskamp-Linkert Carburetor Co.**, and the **Langenskamp-Wheeler Brass Works**, Shelby Street, Indianapolis, Ind., recently organized, have started production, giving employment to about 50 men. Companies are interrelated, manufacturing carburetors and parts for carburetors.

**Schwarze Electric Company**, Adrian, Mich., has perfected new automobile windshield, defroster, metal chromium plate, with copper reflector, heating coil, etc., and plans commercial production. **Harry M. Berry** is general manager. The company operates plating, stamping, tinning and other departments.

**Fuerst Friedman Company**, 1295 East 53rd Street, Cleveland, Ohio, has changed its corporate name to **The Electric Generator and Motor Company**, in order to describe more fully the nature of its business. No change has been made

otherwise. The company rebuilds generators, motors and other electrical equipment.

**Farrel-Birmingham Company**, Ansonia, Conn., has secured a contract from **D-N Incinerator Company**, Winston-Salem, N. C., for all castings, welded parts and other machinery for D-N incinerator plants, and will carry on this line of production at its Ansonia and Derby plants. It is understood that units will be erected in the F-B shops before shipment.

**Alloy Metal Wire Company**, Moore, Pa., has opened a factory branch office at 504 Produce Building, 14th and Racine Streets, Chicago, Ill., to take care of increased business in the midwestern territory. The company manufactures bright annealed stainless steel, monel and nickel products for electrical resistance. **R. L. Howe**, formerly with Truscon Steel Company, is in charge of the new office.

**Krischer's Manufacturing Company**, Brooklyn, N. Y., manufacturers of trunk hardware, buckles and other metal specialties, has leased the **O. B. North Company** plant, New Haven, Conn., and plans to use the added facilities for expansion. The **O. B. North Company** was acquired by the **North and Judd Manufacturing Company** last year. The company will now have a complete nonferrous foundry department.

**Shawinigan Chemical Co., Ltd.**, Montreal, Canada, has been licensed by the **Duriron Company**, Dayton, Ohio, to produce "Duriron" and "Duriron" acid-resistant equipment for all of Canada and Newfoundland. They will make a complete line of pumps, valves, pipe and fittings, and special castings for acid handling service. This is the first instance of a foreign company being granted a manufacturing license for Duriron.

**Wolverine Smelting & Refining Company**, Detroit, Mich., will soon complete its plant at 284 Summit Street, and begin the manufacture of brass ingot, aluminum ingot, lead, solder and babbitt. Capacity will be over 25 tons per day. The company was formed a few months ago by **Dean F. Carscadden** and associates. Mr. Carscadden had been Detroit manager for **Benjamin Harris & Company**, Chicago, for fourteen years.

**The Industrial Equipment Co.**, (**G. G. Crewson** and **Arthur E. Smith**), formerly representing the **Duriron Company**, Dayton, Ohio, in the Buffalo territory, has been dissolved. The **Duriron Company** is now opening a direct sales office in Buffalo under the management of **Guy A. Baker**, who comes from the general office at Dayton. The new office address will be Room 420, Jackson Building, 220 Delaware Avenue, Buffalo.

**Young Radiator Company**, Racine, Wis., manufacturers of radiators for internal combustion engines, Diesel engines, pumps, compressors, power units, trucks, and unit heaters, convectors, car heaters, reports much increased activity during the past three months, and during September and October have been working day and night shifts in their sheet metal, stamping and assembly departments. It is reported much of this activity is developed from a new line of car heaters, convectors and cabinet and wall radiation for homes, offices, buildings, etc., and a new design of unit heater much improved over the product which the company has previously made, the company states.



## Review of the Wrought Metal Business

By J. J. WHITEHEAD

President of the Whitehead Metal Products Company of New York, Inc.

DECEMBER 1, 1931.

The copper industry of the world is undergoing readjustment. During the past month the producers have agreed to a definite curtailment program. The Copper Exporters have lost one of their main members, Phelps Dodge Corporation. Other problems vital to the copper industry are under discussion, and in process of settlement. Everyone can depend on it that these various steps are all constructive in character, and while it may take a long while to get the situation all ironed out, nevertheless gradually we are climbing up the hill and some fine day will be able to look over the top.

During the month the lowest price in history for copper was noted: 6½¢ to 6¾¢. Everyone may be certain that this price is not going to prevail forever, because it is certainly far below the average cost of production.

During September and October business in general picked up considerably, and this, of course, was also reflected in the metal business. However, the last days of November indicated a slackening which may or may not have been seasonal in character. It looks at the moment as if business in general was sort of bouncing along on the bottom. It jumps up and then lets down, but all in all it doesn't go very much lower in volume. This is typical of conditions and times such as we are now passing through.

In the copper and brass industries everyone seems to be up on their toes and going after business as never before. New markets

are looming for copper and its alloys that are capable of development. The use of copper for tanks in automatic hot water storage heaters, range boilers, radiators, etc., offers splendid opportunities which the copper and brass industries are not slow in taking advantage of.

As regards nickel, the statement of R. C. Stanley, president of the International Nickel Co., is significant. He stated on November 24th: "It is a fact that our nickel business in the first 17 days of November was better than in the first 17 days of November, 1930, and better than in the first 17 days of any month since May." Dr. Paul D. Merica, assistant to the president, supplementing Mr. Stanley's remarks, stated that "amounts of nickel in the hands of manufacturers and other consumers were extremely small, and big rush orders came in by wire and phone, causing bulges in business."

What is true of nickel is also probably true of copper and brass, aluminum and other metals. The stocks of products in the hands of consumers are small, and with any slight pick up an active and urgent demand develops at once. This is a good sign.

Aluminum fell off during the summer, but during September, October and November picked up and demand for aluminum products is good.

All in all, it looks as if the worst might be over and that from now on improvement every now and then is to be hoped for, which sooner or later will become more permanent in character.

## Metal Market Review

By R. J. HOUSTON

D. Houston and Company, Metal Brokers, New York

### COPPER

DECEMBER 1, 1931.

During the past month copper declined to the lowest price in history.

The uncertainties of the situation and the absence of any definite corrective movements was reflected in the lack of market animation. Low prices failed to stimulate extensive buying. Apparently American producers were ready to place drastic restrictions on production, but operators of the Katanga properties in Africa insisted on a ratio of output higher than that controlled by the industry here. The present dip to 6½ cents is the lowest the red metal ever touched. Present opportunities to buy copper at such minimum figures may never occur after the current depression runs its course. One thing is absolutely certain, the industry cannot continue to mine and sell copper at ruinous prices.

The month of November wound up with two important developments. Announcement that the Phelps Dodge Corporation had withdrawn from the Copper Exporters, Inc., was made Nov. 25. And advice was received from the Belgian copper interests that the Katanga mine management accepted the plan for world curtailment of copper output.

The market for copper is slightly firmer here at 6¾ cents Connecticut delivery. Export price remains unchanged at 7 cents c.i.f., European ports, with fair demand for foreign shipment.

### ZINC

Early transactions in zinc were fairly large which lifted the price of prime western slab zinc from 3.15 cents East St. Louis basis at beginning of the month to 3.30 cents in the first half. Consuming interest was evident both for prompt and future deliveries in a

limited way, but the general trend of the market did not stimulate large scale buying. Near the end of the month prices again drifted lower, with moderate sales of prime western for December shipment reported at 3¼ cents, equal to East St. Louis delivery. This established the low price of the year, and is a full cent a pound below the high quotations for 1931.

### TIN

Trading in tin throughout a good part of November was quiet in local circles, although activity on the London market was animated especially for future deliveries. Speculative operations abroad were stimulated by the advance in silver, as well as higher prices for wheat and cotton. Prices early in the month touched 22.15 cents for prompt Straits tin. This was the low point for November, but by the 10th of the month the price had advanced to 23.55 cents. The market showed subsequent losses, however, and quotations fluctuated frequently, being governed to a considerable extent by the variations in sterling exchange. Consumers bought on a moderate scale for nearby delivery, and dealers made a few commitments.

Final prices of tin at month-end Nov. 30 established a new low record since 1899 at 21.40¢ for prompt Straits tin. In that year the low point was 19½¢.

### LEAD

There were five price changes in lead during the past month. A market recovery of 20 points occurred in the first half of November, but two reductions in the second half wiped out the previous gain and the market sold off to 3.65 cents East St. Louis and 3.85 cents New York. Final prices were the same as at the beginning of the month, and these were only 10 points above the

low for the year. The several price reductions attracted a fair amount of business, but it did not assume as important proportions as earlier in the period under review. Total sales, however, for November shipment were large. Consumers have also taken a large tonnage for December shipment, and all the principal factors have booked good orders.

### ALUMINUM

Consumption of aluminum is showing an expanding tendency, according to reports from the Detroit district. Automobile manufacturers are preparing to bring out new models in 1932. Producers have consequently booked more business lately, and any substantial increase in automobile production will mean decidedly larger requirements for aluminum. Prices for virgin aluminum of the different grades are steady and show no variation whatever.

### ANTIMONY

Demand for antimony was on a very limited scale. Sellers, however, are not inclined to press metal on the market and buyers were distinctly reticent in stocking up for future requirements. There was a slight show of strength for a short period as a result of higher prices for silver and Chinese regulus was quoted at 7 cents duty paid. This temporary improvement did not last long and the market fell back to 6½@6¾ cents, duty paid, for prompt and nearby futures.

### QUICKSILVER

Recent trading in quicksilver was desultory and at concessions. Substantial sales were made on the downward trend of prices, and buyers were able to acquire round lots at \$68 to \$70 per flask, and some business was reported as low as \$65. Offerings were ample and tone of market lately rather heavy and unsettled.

### PLATINUM

There were no recent developments to specially influence prices of platinum. The refined metal quotes \$37.50 to \$40 per ounce,

with cash transactions at lower figures. A consolidation of producing interests has been effected controlling a major portion of world output. Intensive research is to be conducted for the purpose of increasing the use of platinum and promoting developments tending to increase its distribution and consumption. The International Nickel Co. has greatly increased its output of platinum metals as a by-product of its Canadian mines.

### SILVER

Wide fluctuations in price and heavy transactions characterized silver during the past month. Demand from the Orient and elsewhere increased greatly. During November prices in the regular market price for silver fluctuated between 28½ and 37¼ cents per ounce. Closing price was at the minimum figure. More than 72,000,000 ounces were traded in on the National Metal Exchange during November, and speculative sales were made as high as 40 cents an ounce. The market is less excited than it was a few weeks ago and quotes at end of month 28½ cents.

### OLD METALS

Conditions in the market for secondary metals, especially for copper and brass scrap, were viewed as considerably unsettled lately owing to the decline in new copper and uncertainty over the outcome of curtailment of discussions by World copper producers. There appears to be an ample supply of material called for, but sellers have been reluctant to accept recent low bids. There is a firmer tone apparent at present, however, and buyers appear more eager to purchase at current rates obtainable. Exporters are also ready to trade on a moderate scale, but with some prospect of a slight upward trend to values holders are not inclined to offer the copper grades too freely. Lead material was in supply at lower prices due to the easier market for the primary product. Heavy and light brass have been in moderate demand at extremely low prices, but holders show little interest in current low bids. There seems to be some indications of better resistance in the general market to any further downward trend of values.

## Daily Metal Prices for the Month of November, 1931

### Record of Daily, Highest, Lowest and Average Prices and the Customs Duties

	2	3*	4	5	6	9	10	11	12	13	16	17
<b>Copper c/lb. Duty Free</b>												
Lake (Del.)	7.375	.....	7.375	7.375	7.375	7.375	7.375	7.375	7.375	7.375	7.375	7.375
Electrolytic (f.a.s. N. Y.)	7.125	.....	7.125	7.125	7.125	7.375	7.375	7.375	7.25	7.25	7.25	7.25
Casting (f.o.b. ref.)	7.00	.....	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
<b>Zinc (f.o.b. St. L.) c/lb. Duty 1¼c/lb.</b>												
Prime Western	3.15	.....	3.15	3.175	3.175	3.225	3.25	3.25	3.30	3.30	3.30	3.30
Brass Special	3.25	.....	3.25	3.275	3.275	3.325	3.35	3.35	3.40	3.40	3.40	3.40
<b>Tin (f.o.b. N. Y.) c/lb. Duty Free</b>												
Straits	22.20	.....	22.15	22.375	22.875	23.50	23.55	23.125	23.15	23.00	23.25	23.15
Pig 99%	21.65	.....	21.50	21.75	22.375	22.90	22.95	22.50	22.55	22.40	22.70	22.60
<b>Lead (f.o.b. St. L.) c/lb. Duty 2¼c/lb.</b>												
Aluminum c/lb. Duty 4c/lb.	23.30	.....	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
<b>Nickel c/lb. Duty 3c/lb.</b>												
Ingot	35	.....	35	35	35	35	35	35	35	35	35	35
Shot	36	.....	36	36	36	36	36	36	36	36	36	36
Electrolytic	35	.....	35	35	35	35	35	35	35	35	35	35
<b>Antimony (J. &amp; Ch.) c/lb. Duty 2c/lb.</b>												
Silver c/oz. Troy Duty Free	31.00	.....	31.25	32.75	34.00	35.75	37.25	35.375	36.25	35.375	32.625	31.125
Platinum \$/oz. Troy Duty Free	37.50	.....	37.50	37.50	37.50	37.50	37.50	37.50	37.50	37.50	37.50	37.50
	18	19	20	23	24	25	26*	27	30	High	Low	Aver.
<b>Copper c/lb. Duty Free</b>												
Lake (Del.)	7.375	7.375	6.75	6.75	6.75	6.75	.....	6.75	6.875	7.375	6.75	7.184
Electrolytic (f.a.s. N. Y.)	7.00	7.00	6.75	6.75	6.75	6.25	.....	6.75	6.75	7.375	6.25	7.033
Casting (f.o.b. ref.)	6.625	6.25	6.25	6.25	6.25	6.00	.....	6.25	6.50	7.00	6.00	6.704
<b>Zinc (f.o.b. St. L.) c/lb. Duty 1¼c/lb.</b>												
Prime Western	3.25	3.25	3.20	3.15	3.15	3.15	.....	3.125	3.125	3.30	3.125	3.209
Brass Special	3.35	3.35	3.30	3.25	3.25	3.25	.....	3.225	3.225	3.40	3.225	3.309
<b>Tin (f.o.b. N. Y.) c/lb. Duty Free</b>												
Straits	22.75	22.75	23.10	22.85	23.00	22.875	.....	22.25	21.40	23.55	21.40	22.805
Pig 99%	22.15	22.15	22.50	22.25	22.40	22.25	.....	21.75	20.875	22.95	20.875	22.221
<b>Lead (f.o.b. St. L.) c/lb. Duty 2¼c/lb.</b>												
Aluminum c/lb. Duty 4c/lb.	23.30	23.30	23.30	23.30	23.30	23.30	.....	23.30	23.30	23.30	23.30	23.30
<b>Nickel c/lb. Duty 3c/lb.</b>												
Ingot	35	35	35	35	35	35	.....	35	35	35	35	35
Shot	36	36	36	36	36	36	.....	36	36	36	36	36
Electrolytic	35	35	35	35	35	35	.....	35	35	35	35	35
<b>Antimony (J. &amp; Ch.) c/lb. Duty 2c/lb.</b>												
Silver c/oz. Troy Duty Free	29.75	30.375	30.75	29.75	30.125	29.75	.....	29.625	28.375	37.25	28.375	32.171
Platinum \$/oz. Troy Duty Free	37.50	37.50	37.50	37.50	37.50	37.50	.....	37.50	37.50	37.50	37.50	37.50

\*Holiday.

# Metal Prices, December 7, 1931

(Duties mentioned refer to U. S. tariffs on imports, as given in the Tariff Act of 1930.)

## NEW METALS

Copper: Lake, 6.875. Electrolytic, 6.50. Casting, 6.25.  
Zinc: Prime Western, 3.175. Brass Special, 3.275.  
Tin: Straits, 20.60. Pig, 99%, 20.125.  
Lead: 3.65. Aluminum, 23.30. Antimony, 6.25.

Duties: Copper, free; zinc, 1¼c. lb.; tin, free; lead, 2¼c. lb.; nickel, 3c. lb.; quicksilver, 25c. lb.; bismuth, 7½%; cadmium, 15c. lb.; cobalt, free; silver, free; gold, free; platinum, free.

Nickel: Ingot, 35. Shot, 36. Elec. 35. Pellets, 40.  
Quicksilver: flask, 75 lbs., \$70. Bismuth, \$1.15.  
Cadmium, 55. Cobalt, 97%, \$2.50. Silver, oz., Troy (N. Y. official price December 8), 29.625.  
Gold: oz., Troy, \$20.67. Platinum, oz., Troy, \$37.50 to \$40.00.

## INGOT METALS AND ALLOYS

		Duty
Brass Ingots, Yellow	5¼ to 7½	45%
Brass Ingots, Red	6¼ to 8½	45%
Bronze Ingots	9¼ to 11½	45%
Casting Aluminum Alloys	19 to 22	4c. lb.
Manganese Bronze Castings	18 to 35	45%
Manganese Bronze Ingots	7 to 11	45%
Manganese Bronze Forgings	26 to 35	45%
Manganese Copper, 30%	17 to 25	25%
Monel Metal Shot or Blocks	28	25%
Phosphor Bronze Ingots	9 to 12	45%
Phosphor Copper, guaranteed 15%	10½ to 14½	3c. lb.
Phosphor Copper, guaranteed 10%	10¼ to 14	3c. lb.
Phosphor Tin, no guarantee	30 to 40	Free
Silicon Copper, 10%	17 to 35	45%
Iridium Platinum, 5%	\$43.00	Free
Iridium Platinum, 10%	46.00	Free

## OLD METALS

Dealers' buying prices, wholesale quantities	Cents lb.	Duty
Heavy copper and wire, mixed	5 to 5¼	Free
New copper clippings	5 to 5¼	Free
Light copper	4¾ to 4½	Free
Heavy yellow brass	2¾ to 3½	Free
Light brass	2¼ to 2½	Free
No. 1 composition	4¼ to 4½	Free
Composition turnings	4 to 4¼	Free
Heavy soft lead	2¾ to 3	2½c. lb.
Old zinc	1¼ to 1½	1½c. lb.
New zinc clips	2 to 2¼	1½c. lb.
Aluminum clips (new, soft)	12½ to 13	4c. lb.
Scrap aluminum, cast, mixed	3¼ to 3½	4c. lb.
Scrap aluminum sheet (old)	9 to 9½	4c. lb.
No. 1 pewter	13 to 14	Free
Nickel anodes	21 to 23	10%
Nickel sheet clips; rod ends (new)	23 to 24	10%
Monel scrap	6 to 7	3c. lb.

## Wrought Metals and Alloys

The following are net BASE PRICES per pound, to which must be added extras for size, shape, small quantity, packing, etc., as shown in manufacturers' price lists, effective November 27, 1931.

### COPPER MATERIAL

	Net base per lb.	Duty
Sheet, hot rolled	15½c.	2½c. lb.
Bare wire	8½c.	25%
Seamless tubing	15½c.	7c. lb.
Soldering coppers	16½c.	45%

### NICKEL SILVER (NICKELENE)

(Duty 30% ad valorem.)

Grade "A" Sheet Metal	Wire and Rod
10% Quality	21½c.
15% Quality	23½c.
18% Quality	24½c.
10% Quality	24½c.
15% Quality	28½c.
18% Quality	32 c.

### BRASS MATERIAL—MILL SHIPMENTS

	High Brass	Low Brass	Bronze	Duty
Sheet	12¾c.	14¾c.	14¾c.	4c. lb.
Wire	12¾c.	14¾c.	14¾c.	25%
Rod	10¾c.	14¾c.	14¾c.	4c. lb.
Brazed tubing	21¾c.		25 c.	12c. lb.
Open seam tubing	20¾c.		22¾c.	25%
Angles, channels	20¾c.		22¾c.	12c. lb.
Seamless tubing	16¾c.		17½c.	8c. lb.

### TOBIN BRONZE AND MUNTZ METAL

(Duty 4c. lb.)

Net base prices per pound.

Tobin Bronze Rod	14¾c.
Muntz or Yellow Metal Sheathing (14"x48")	15 c.
Muntz or Yellow Rectangular sheet other sheathing	15 c.
Muntz or Yellow Metal Rod	11½c.

### ALUMINUM SHEET AND COIL

(Duty 7c. per lb.)

Aluminum sheet, 18 ga., base, ton lots, per lb.	32.30
Aluminum coils, 24 ga., base price	30.00

### ROLLED NICKEL SHEET AND ROD

(Duty 25% ad valorem, plus 10% if cold worked.)

Net Base Prices

Cold Drawn Rods	50c.	Cold Rolled Sheet	60c.
Hot Rolled Rods	45c.	Full Finished Sheet	52c.

### MONEL METAL SHEET AND ROD

(Duty 25% ad valorem, plus 10% if cold worked.)

Hot Rolled Rods (base)	35	Full Finished Sheets (base)	42
Cold Drawn Rods (base)	40	Cold Rolled Sheets (base)	50

### SILVER SHEET

Rolled sterling silver (December 8) 32.75c. per Troy oz. upward, according to quantity. (Duty free.)

### ZINC AND LEAD SHEET

	Cents per lb.	Duty
Zinc sheet, carload lots, standard sizes and gauges, at mill, less 7 per cent discount	9.00	2c. lb.
Zinc sheet, open casks (jobbers' price)	9.25	2c. lb.
Zinc sheet, open casks (jobbers' price)	10.00 to 10.25	2c. lb.
Full Lead Sheet (base price)	7.00	2½c. lb.
Cut Lead Sheet (base price)	7.25	2½c. lb.

### BLOCK TIN SHEET

(Duty free.)

Block Tin Sheet—18" wide or less. No. 26 B. & S. Gauge or thicker, 100 lbs. or more, 12c. over N. Y. Pig Tin; 50 to 100 lbs., 18c. over; 25 to 50 lbs., 20c. over; less than 25 lbs., 25c. over.

### BRITANNIA METAL SHEET

No. 1 Britannia—18" wide or less. No. 26 B. & S. Gauge or thicker, 500 lbs. or over, 10c. over N. Y. tin price; 100 lbs. to 500 lbs., 12c. over; 50 to 100 lbs., 18c. over; 25 to 50 lbs., 20c. over; less than 25 lbs., 25c. over. Prices F. O. B. mill. (Duty free.)



# Supply Prices, December 7, 1931

## ANODES

Copper: Cast .....	18½c. per lb.	Nickel: 90-92% .....	44c. to 45c. per lb.
Rolled, sheets, trimmed .....	17½c. per lb.	95-97% .....	41c. to 47c. per lb.
Rolled, oval .....	15½c. per lb.	99% .....	41c. to 49c. per lb.
Brass: Cast .....	18½c. per lb.	Silver: Rolled silver anodes .999 fine were quoted December 8	
Zinc: Cast .....	10½c. per lb.	from 32.75c. per Troy ounce upward, depending upon quantity.	

## FELT POLISHING WHEELS WHITE SPANISH

Diameter	Thickness	Under 50 lbs.	50 to 100 lbs.	Over 100 lbs.
10-12-14 & 16	1" to 2"	\$3.00/lb.	\$2.75/lb.	\$2.65/lb.
10-12-14 & 16	2 to 3½	3.00	2.70	2.50
6-8 & over 16	1 to 3½	3.10	2.85	2.70-2.75
6 to 24	Under ½	4.25	4.00	3.90
6 to 24	½ to 1	4.00	3.75	3.65
6 to 24	Over 3	3.40	3.15	3.05
4 to 6	¼ to 3	4.85	4.85	4.85
4 to 6	Over 3	5.25	5.25	5.25
Under 4	¼ to 3	5.45	5.45	5.45
Under 4	Over 3	5.85	5.85	5.85

On grey Mexican wheels deduct 10c. per lb. from White Spanish.

## COTTON BUFFS

Full disc open buffs, per 100 sections, when purchased in lots of 100 or less:

11" 20 ply 64/68 Unbleached.....	\$14.85 to \$15.95
14" 20 ply 64/68 Unbleached.....	24.00 to 25.80
11" 20 ply 80/92 Unbleached.....	18.20 to 19.20
14" 20 ply 80/92 Unbleached.....	29.30 to 31.20
11" 20 ply 84/92 Unbleached.....	24.10 to 24.60
14" 20 ply 84/92 Unbleached.....	39.30 to 40.10
11" 20 ply 80/84 Unbleached.....	24.10 to 24.60
14" 20 ply 80/84 Unbleached.....	39.30 to 40.10
Sewed Pieced Buffs, per lb., bleached.....	42c. to 71c.

## CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone .....	lb.	.09¾-.14	Lacquer Solvents .....	gal.	.85
Acid—Boric (Boracic) Powdered.....	lb.	.08¾-.09½	Lead Acetate (Sugar of Lead) .....	lb.	.13¾
Chromic, 75 to 400 lb. drums .....	lb.	.14¾-.17½	Yellow Oxide (Litharge) .....	lb.	.12½
Hydrochloric (Muriatic) Tech., 20 deg., carboys .....	lb.	.02	Mercury Bichloride (Corrosive Sublimate).....	lb.	\$1.58
Hydrochloric, C. P., 20 deg., carboys .....	lb.	.06	Nickel—Carbonate, dry bbls. ....	lb.	.32
Hydrofluoric, 30%, bbls. ....	lb.	.08	Chloride, bbls. ....	lb.	.18-19½
Nitric, 36 deg., carboys .....	lb.	.06	Salts, single, 300 lb. bbls.....	lb.	.10½-.13
Nitric, 42 deg., carboys .....	lb.	.07	Salts, double, 425 lb. bbls.....	lb.	.10½-.13
Sulphuric, 66 deg., carboys .....	lb.	.02	Paraffin .....	lb.	.05-.06
Alcohol—Butyl .....	lb.	14.45-21.70	Phosphorus—Duty free, according to quantity.....	lb.	.35-.40
Denatured drums .....	gal.	.27-.33	Potash Caustic Electrolytic 88-92% broken, drums..	lb.	.06¾-.08½
Alum—Lump, barrels .....	lb.	.03¼-.04	Potassium Bichromate, casks (crystals).....	lb.	.09¾
Powdered, barrels .....	lb.	.03½-.04	Carbonate, 96-98% .....	lb.	.06¾
Ammonium sulphate, tech., bbls. ....	lb.	.03¾	Cyanide, 165 lbs. cases, 94-96%.....	lb.	.50-.60
Sulphocyanide .....	lb.	.36	Pumice, ground, bbls. ....	lb.	.02½
Arsenic, white, kegs .....	lb.	.04½-.05	Quartz, powdered .....	ton	\$30.00
Asphaltum .....	lb.	.35	Rosin, bbls. ....	lb.	.04½
Benzol, pure .....	gal.	.58	Rouge, nickel, 100 lb. lots.....	lb.	.25
Borax Crystals (Sodium Biborate), bbls. ....	lb.	.04¾	Silver and Gold .....	lb.	.65
Cadmium oxide, 50 to 1,000 lbs. ....	lb.	.65	Sal Ammoniac (Ammonium Chloride) in bbls.....	lb.	.04½-.05¾
Calcium Carbonate (Precipitated Chalk) .....	lb.	.04	Silver Chloride, dry, 100 oz. lots.....	oz.	.28¾
Carbon Bisulphide, Drums .....	lb.	.06	Cyanide (fluctuating) .....	oz.	.36½
Chrome Green, bbls. ....	lb.	.24	Nitrate, 100 ounce lots.....	oz.	.24¾
Chromic Sulphate .....	lb.	.30-.40	Soda Ash, 58%, bbls. ....	lb.	.023
Copper—Acetate (Verdigris) .....	lb.	.23	Sodium—Cyanide, 96 to 98%, 100 lbs.....	lb.	.16½-.17
Carb-mate, bbls. ....	lb.	.15-.16	Hyposulphite, kegs .....	lb.	.03½-.04
Cyanide (100 lb. kgs.).....	lb.	.39	Metasilicate .....	lb.	.05-.06¾
Sulphate, bbls. ....	lb.	.041-.0475	Nitrate, tech., bbls. ....	lb.	.03¾
Cream of Tartar Crystals (Potassium Bitartrate) ..	lb.	.27	Phosphate, tech., bbls. ....	lb.	.03¾
Crocus .....	lb.	.15	Silicate (Water Glass), bbls. ....	lb.	.02
Dextrin .....	lb.	.05-.08	Stannate .....	lb.	.22½
Emery Flour .....	ton	.06	Sulphocyanide .....	lb.	.28-.45
Flint, powdered .....	ton	\$30.00	Sulphur (Brimstone), bbls. ....	lb.	.02
Fluor-spar, bags .....	ton	.04½	Tin Chloride, 100 lb. kegs.....	lb.	.25½-.27
Gold Chloride .....	oz.	\$12.00	Tripoli, Powdered .....	lb.	.03
Gum—Sandarac .....	lb.	.26	Wax—Bees, white, ref. bleached.....	lb.	.60
Shellac .....	lb.	.59-.61	Yellow, No. 1 .....	lb.	.45
Iron Sulphate (Copperas), bbl. ....	lb.	.01½	Whiting, Bolted .....	lb.	.02½-.06
			Zinc, Carbonate, bbls. ....	lb.	.11
			Chloride, casks .....	lb.	.06¾
			Cyanide (100 lb. kegs) .....	lb.	.38
			Sulphate, bbls. ....	lb.	.03¾

# Justified Confidence in MONARCH EQUIPMENT

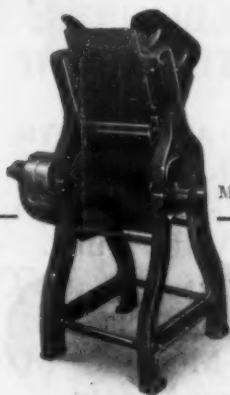


"TILTING REVERBERATORY" Furnace  
—250 lb.—3-Ton Capacity. All fuels.



SIMPLEX FURNACE FIG. No. 92  
Capacities from 500 to 24,000 lbs. per heat.  
Ask for detailed catalogue. Nos. 91 to 98—  
Air from 8 to 16 ounces from blower. Refer-  
ences furnished.

SAND



MIXER

## MONARCH FOUNDRY FURNACES AND EQUIPMENT

have been keeping pace with pro-  
duction methods for many years.  
This is not strange because the  
figures secured which are used for  
production purposes were derived  
from Monarch Equipment per-  
formance. You should investi-  
gate.

Metal Melting Furnaces  
Core Ovens  
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Cupolettes  
Mold Dryers  
Reverberatory Furnaces

Monarch Furnaces—with or without  
crucibles. Fuels—Oil—Gas—Coal—Coke.

Write for Catalogue.  
TMI-12

1931



STATIONARY CRUCIBLE FURNACE—  
Low Air, Combustion Chamber



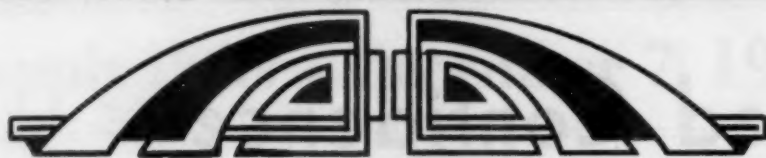
REVOLVING FURNACE—MOTOR  
DRIVEN

For Melting Brass, Copper, Aluminum, Gold,  
Silver and Other Metals and Alloys  
oil — gas

## The Monarch Engineering & Mfg. Co.

701-702 American Bldg., Baltimore, Md., U. S. A.

Works: Curtis Bay, Md.



# The Metal Industry

**IS THE BEST BUSINESS PUBLICATION  
FOR ADVERTISING THE FOLLOWING:**

**CASTING METALS AND ALLOYS, All Kinds—New and Old—Ingot and Scrap.**

**WROUGHT METALS AND ALLOYS, All Kinds in the form of Plate, Sheet, Rod, Wire, Tube.**

**ALL KINDS OF FURNACES AND CRUCIBLES for Melting, Refining and Annealing Metals.**

**ALL KINDS OF MOLDING MACHINES and Foundry Equipment for Molding Metals.**

**ALL KINDS OF MACHINERY FOR FINISHING METAL CASTINGS, such as Turret Lathes, Engine Lathes, Speed Lathes, etc.**

**ALL KINDS OF MACHINERY FOR FORMING WROUGHT METALS, such as Rolling Mills, Draw Benches, Power Presses, Spinning Lathes, etc.**

**ALL KINDS OF MACHINERY for Grinding and Polishing Metals, such as Grinders, Polishers, etc.**

**ALL KINDS OF PLATERS' AND POLISHERS' MACHINERY AND SUPPLIES, from Tanks and Dynamos to Anodes and Chemicals and from Burnishing Barrels and Polishing Lathes to Buffs, Compositions and Lacquers and Enamels.**

**In fact, every Metal, Furnace, Machine and Supply that is used in the founding, stamping, machining, cleaning, plating, polishing and finishing of metals can be advertised most advantageously in**

**THE METAL INDUSTRY**

**116 JOHN STREET  
NEW YORK**

AUDIT BUREAU OF CIRCULATIONS

MEMBER OF

ASSOCIATED BUSINESS PAPERS

**ABC**

**ABP**



AJAX  
AJAX



Electric Melting Furnaces

PRODUCE

QUALITY CASTINGS

AT

LOW COST

COPPER

PHOSPHOR BRONZE  
NICKEL SILVER

RED BRASS  
YELLOW BRASS


ZINC

AJAX ELECTRIC FURNACE CORPORATION

Division of The Ajax Metal Co.

PHILADELPHIA

AJAX  
AJAX





## **CRUCIBLES**

## **STOPPERS**

*Established in 1872. Sixty years of successful operation.  
This record is proof of the superior quality of our  
products. Write or send us your next order.*

**McCULLOUGH-DALZELL CRUCIBLE CO.**  
Pittsburgh, Pa.





**When competition is  
keenest wise foundry-  
men swing to quality  
products:**

A small order sent today for Lava  
Crucibles will convince you that a mate-  
rial saving can be made in crucible  
expenditures.

*There is no substitute for quality.*

Lava Crucible Co. of Pittsburgh  
Wabash Bldg.  
Pittsburgh, Pa.

## **CRUCIBLES**

*"Every Refractory For The Foundry"*

### Only Quality Can Maintain Popularity

- And in BEAVER BRIGHT burnishing materials quality comes first.
  - Quality raw materials
  - Quality forming for maintaining accuracy
  - Quality workmanship for uniformity and smoothness
  - Quality of design — enabling complete burnishing in every angle and groove.
- Result—a quality that cannot be duplicated and, what's more, a quality that never varies.

Users of Beaver Burnishing Materials will tell you so—and there are more of them every day.


**H. Leroy Beaver**  
 3rd and Venango Sts.  
 Philadelphia, Pa.

## **ANNOUNCEMENT**

Metals in all forms are advertised in  
the rear advertising pages—  
immediately after the Metal Prices.

**IF YOU HAVE DIFFICULT SOLDERING**  
**"IT CAN BE DONE"**  
 with

**END YOUR  
SOLDERING  
TROUBLES**



**SAMPLE  
FREE**

can be used on all metals and their alloys  
JOHNSON MFG. CO., 729 Washington Blvd., Chicago, Ill.
Except  
Aluminum

## **Fisher Furnaces**

*for melting*

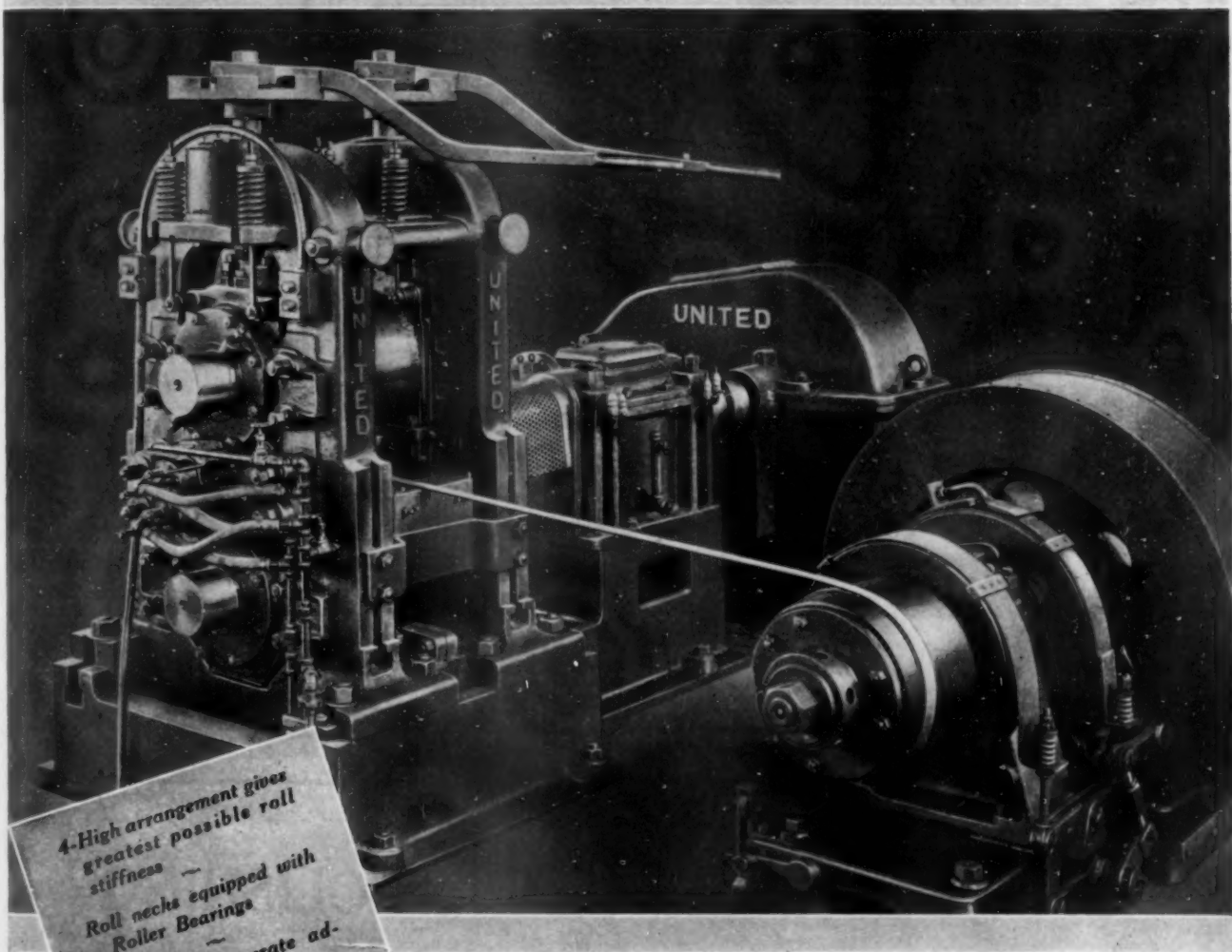
### **Brass—Bronze—Aluminum**

**Oil or Gas Fired**

**ALFRED FISHER FURNACES INC.**  
1235 S. 52nd Ave., Cicero, CHICAGO, ILL.

# 4 HIGH MILL FEATURES

PATENTED



4-High arrangement gives  
greatest possible roll  
stiffness

Roll necks equipped with  
Roller Bearings

Convenient accurate ad-  
justment

Simplicity of construction

Rugged Design

Smooth regular motion

Positive lubrication of  
moving parts

Cold Rolled Strip, whether of steel or other metals, is the most accurately and highly finished product of any rolling operation, and to produce it requires the best possible rolling mills. "United" has developed Four-High mills to meet the most exacting requirements and wherever installed are producing a product very accurate and true to gauge across and from end to end. The success with which they are operating is evidence of their ability to stand up under mill conditions.



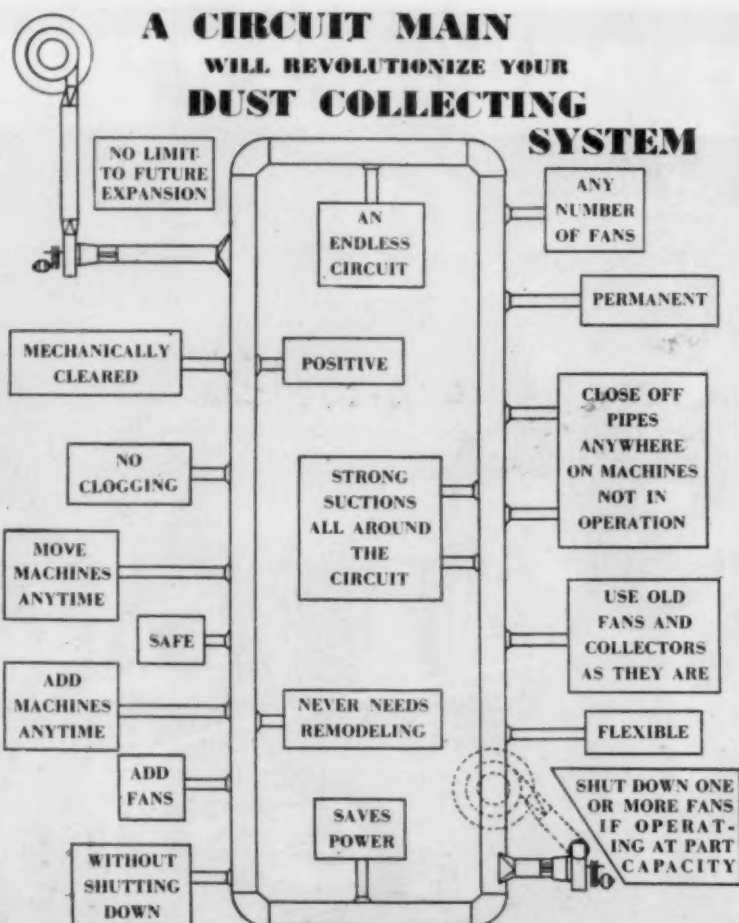
# UNITED

ENGINEERING AND FOUNDRY COMPANY  
PITTSBURGH . . . . . PENNSYLVANIA

THE WORLD'S LARGEST MAKER OF ROLLS AND ROLLING MILL EQUIPMENT



THE LEADERS SINCE 1886 MFG. CO.  
**ALLINGTON & CURTIS**  
FACTORIES & OFFICES, SAGINAW, MICH. AND BOSTON  
OFFICES, CHICAGO AND NEW YORK



THE SECRET OF PERMANENCE & FLEXIBILITY & ECONOMY IS, the conveying through the main is done positively and efficiently by a slow-moving mechanical conveyor. Strong suctions but no high air velocities in the main



"Sergeant Burr Nish"

## STEEL BURNISHING and POLISHING BALLS

ODD SHAPES STEEL BURNISHING MATERIAL  
BURNISHING SOAP CHIPS

MANUFACTURED BY

**THE HARTFORD STEEL BALL COMPANY**  
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### BELKE Rheostats

Most beautiful Rheostat made. Low in price and highly recommended. Extremely accurate and closely calibrated.

The Belke Commutating Rheostat replaces a large number of knife switches by using one rotary blade for every five clips. The blade brightens itself as it rotates through the clips, in this manner always presenting a clean surface, assuring perfect contact.

**BELKE MFG. CO.**  
321 S. CALIFORNIA AVE.  
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## Chemical Lead Burning

Lead Chemical Equipment

### LEAD LINED TANKS

Lead Linings for Tanks, Vats, etc.; Lead Coils; Lead Sleeves; Agitators; Lead, Acid Jugs and Carboys; Acid Waste Line; Lead and Lead Lined Pipe and Fittings; Special Lead Traps and Drain Boxes; Pure Tin Linings for Vessels of Every Character

CHEMICAL LEAD WORK OF EVERY DESCRIPTION

**JOHN F. ABERNETHY & CO., INC.**  
708-710 Myrtle Ave., Established 1901 BROOKLYN, N. Y.

# TELETYPEWRITERS



*Connect The Republic Steel Corporation's mills in 10 cities*

*Save at least 24 hours in production on rush orders*

*Enable the company to give exceptional service to customers*

*Cut communication and operating costs materially*

TELETYPEWRITERS\* are used by The Republic Steel Corporation to co-ordinate the activities of its widely separated mills and offices. The service—typewriting by wire—makes possible a constant flow of typed messages between any or all of the far-off units. Each message is reproduced accurately the moment it is sent.

"We experienced an immediate dollars-and-cents saving after installing Teletypewriters," an official says. "All inter-plant business was speeded. Most important, however, the Teletypewriters allowed us to give even better service to our customers than had been possible before."



*Each plant can quickly obtain necessary information in typewritten form from any or all others. Messages of every character are transmitted. The time saved is an important item.*

Teletypewriter Service is used by every department of this corporation in controlling plant operations. It is especially valuable in the transmission of orders. Details of metallurgical treatment, pricing, credit, delivery dates, shipping instructions, changes in specifications, etc., are exchanged. Errors are eliminated, as each person interested has an identical typewritten copy of every message.

Businesses large and small

are using Teletypewriters to connect offices in the same building, buildings in the same city, or offices separated by hundreds or thousands of miles. They effect many economies. Your local Bell Company will be glad to discuss with you this modern method of communication.

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**FARREL-BIRMINGHAM**

COMPANY INC.

201 MAIN STREET, ANSONIA, CONN.

**Rolling Mills and  
Metal Working  
Machinery**

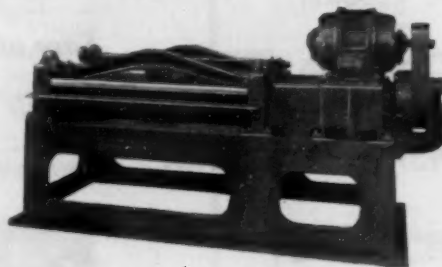
Rolls	Straight-sided, Single
Rolling Mills	and Double Crank
Blockers, Coilers,	Tie Rod Presses
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Balance Wheels	Drop Hammers and
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Accumulators	Blast Gates
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Engineering or Performance Data, with  
list of installations and specifications for  
any machine on request.

NEW RECORDS FOR PRODUCTION AND PRECISION ARE  
MADE ON FARREL-BIRMINGHAM MACHINES

No. 1444  
**FLATTENER**

**A Flattening Machine Particularly Designed for  
Thin Gauge Metal in Wide Widths.**

Nineteen flattening rolls 2" diameter up to 50" face  
in closely spaced staggered arrangement, all driven,  
giving the best flattening effect to thin gauge material.

An additional pair of feed rolls employed, 3 3/4"  
diameter by 50" face.

All flattening rolls are backed up in the center by  
supporting rollers.

The ten-top rolls are adjustable vertically.

Capacity for metal up to 1/16" thick by 48" width.

**The Torrington Mfg. Company**

TORRINGTON, CONNECTICUT, U. S. A.

**Metal Spinning Lathes**

Tools, Chucks and Accessories for  
Round and Oval Work



22" Oval Spinning Lathe  
with Compound Slide Rest

SEND FOR PRICE LIST

Sizes of the Regular Machines run from  
15" to 26" Swing and the Extension or Gap  
Type Lathes will be furnished in 22" x 44"  
Swing Size, and 27" x 60" Swing Size.

**P. PRYBIL MACHINE CO., Inc.**

Established 1859

41-31 Vernon Blvd. Long Island City, N. Y.

**Your Choice Must Be "Dixon's"**

In 1827, Joseph Dixon made the first successful Graphite Crucible. Since that time, the Joseph Dixon Crucible Company has maintained its position as the world's foremost producer of high grade crucibles. Dixon builds into crucibles that quality which gives long life, economy, and durability beyond any reasonable expectation. If you base your judgement of crucible value on the cost per pound of metal melted, your choice must be "Dixon's".

If the safety of the men and freedom from breakage is the test, your choice must be "Dixon's".

If the quality of the metal, its freedom from impurities, or the long service of the crucible are used as standards, YOUR CHOICE MUST BE "DIXON'S".

Send for the booklet "Crucibles, Their Care and Use". It will show you how to get more heats from any crucible.

**Joseph Dixon Crucible Co.**  
Jersey City, New Jersey, U.S.A.

Established in 1827

USE ONLY THE  
CHAS. K.  
SCHWEIZER CO.  
**MOULDS**  
Waterback and Plain

207 Vine Street  
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**SOLDER, BAB-  
BITT, LINO-  
TYPE, TIN AND  
LEAD MOULDS.**

Send your inquiries  
on special designs.

**ROCKWELL  
FURNACES  
ELECTRIC and FUEL**

W. S. ROCKWELL COMPANY

(Member of Industrial Furnace Manufacturers Association)

New York Chicago Detroit  
Cleveland Montreal Indianapolis

December, 1931





**POSITIVE CLEANER**

*Distributors for*

Plating and Polishing equipments and supplies

## clean right for finish bright

*A Chemically Clean Surface*

*Eliminates Plating Troubles*

### Hesgum Positive Cleaner

will act as a silent helper in cleaning metal surfaces of all descriptions and in all classes of work.

### HESSE & GUMM CHEMICAL CO.

INDUSTRIAL CLEANING COMPOUNDS

FACTORY and LABORATORY

340-342 Coit Street, Irvington, N. J.

Telephone FRontenac 3-4079

## LACQUER ON METAL

*Of outstanding  
APPEARANCE  
and  
DURABILITY*

**COOPER'S  
CERTIFIED  
CHEMICALS**

*for use on*

Gold—Silver—Bronze, etc.

### Combined Cooplac No. 9

Furnished in any color if desired.

For brush, spray or dip

A Paint—A Varnish—A Lacquer

### Water White Cooplac

No. 82

For spraying or dipping

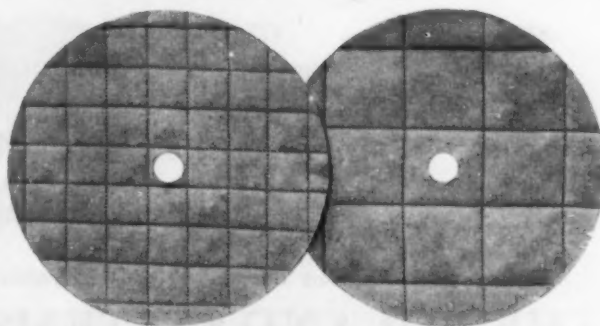
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For brushing

We are Pioneer Manufacturers in the United States, of Lacquers and the full line of Platers' Chemicals.

*Let us know your requirements*

Works: **Chas. Cooper & Co.** 1857  
Newark, N. J. 196 Worth St., New York, N. Y. 1931



## YERGES BUFFS

### Uniform Density

Yerges Buffs are square-stitched—the stitching spaced anywhere from 1/8-inch to 4 inches apart, providing wheels for the fastest and hardest cutting or the softest color buffing, and at all times presenting a face of uniform density free from soft or hard spots. A custom buff at quantity prices. Phone or write to

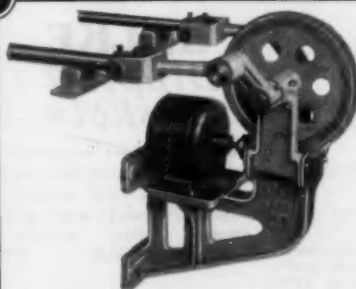
### Yerges Mfg. Co., Fremont, Ohio



### BELKE Rubberite Tank Lining

A practical coating for making tanks leak proof and acid proof. This composition consists of 30% rubber and 70% other ingredients. Belke rubberite provides a lasting hard surface and will not crack, scale or run in the hottest weather. It is unaffected by acids or caustics and can be used to protect either wood or steel tanks. The advantage of Rubberite is in its economy.

**BELKE MFG. Co.**  
3215 CALIFORNIA AVE.  
CHICAGO

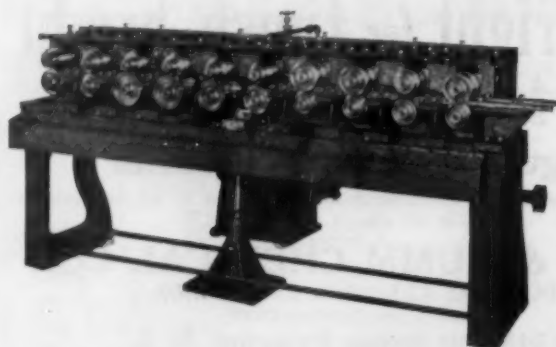


### BELKE Rod Agitator

Is very inexpensive, requires no rearrangement of tanks and fits the dimensions of all tanks.

Absolutely necessary for plating die castings. Consists of a motor and a gear which draws two arms back and forth over the plating tank. This keeps the work in motion, prevents formation of gas bubbles and eliminates burning.

**BELKE MFG. Co.**  
3215 CALIFORNIA AVE.  
CHICAGO



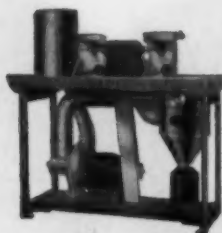
## Yoder LH-10 Strip Rolling Machine

We build the L. H. machines for No. 20 gauge or lighter metal and with from 4 to 10 pairs of rolls. Suitable for forming angles, channel, moldings, lock seam and butt seam tubing, weatherstrip, conduit tube, automobile trim, etc. Sections rolled from 90° to 200° per minute. These machines, as well as our MH and H types, larger and for heavier sections, are standard throughout the world. Our 20 years' experience places us in position to advise you and serve you advantageously. Send us samples or blueprints for estimates.

**THE YODER COMPANY**  
W. 55 ST. and WALWORTH AVE. CLEVELAND, OHIO  
PLATE AND SHEET METAL MACHINERY SPECIALISTS



Blowers



Polishing Benches



Ventilators



Tubbing Machines



Drying Systems



Sand Blasts

## THE BOLAND SYSTEMS FOR FACTORY INSTALLATIONS

Tanks, Coloring Rooms, Dynamos, Sawdust Boxes

H. J. ASTLE & CO.

(Send for Catalogues)

118 Orange Street, Providence, Rhode Island

## Brushes of All Kinds

Made of Brass, Steel, Fibres and Bristle



For Chandelier Manufacturers, Silver and Nickel Platers and all Industrial Work.

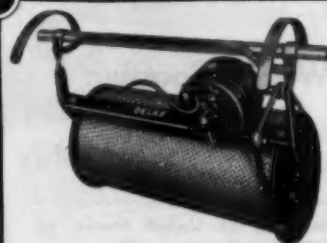
Also Brushes for Toilet Sets, Repairing Promptly Attended to.

**H. Blumenthal & Co., Inc.**

241-243-245 Centre St.

New York

Send us one of your old brushes for us to duplicate



## BELKE Small Portable Plating Barrel

All Micarta motor driven unit with cylinder 10"x18". This is a good sized barrel and will handle 20 lbs of work. Priced low.

A Portable barrel will enable you to plate brass, nickel, copper, cadmium, silver or any finish you want if you are (STILL PLATING) these metals at the present time.

**BELKE MFG. Co.**  
321 S. CALIFORNIA AVE.  
CHICAGO



Style 2  
Bucket Handle

## BELKE Dipping Baskets

Perforated sheet metal and woven wire dipping baskets made of brass, steel, copper, aluminum, monel and nichrome. Best made—reasonably priced.

Use Nichrome. It is well worth the small additional initial cost to stop the bother of constantly buying new baskets.

**BELKE MFG. Co.**  
321 S. CALIFORNIA AVE.  
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## Metropolitan Distributors for

Hanson-Van Winkle-Munning Company  
**PLATING and POLISHING SUPPLIES**  
AND EQUIPMENT . .

*We Carry a Complete Stock  
of Supplies!!*

**BEAM-KNODEL, Inc.**

199 LAFAYETTE ST.

NEW YORK CITY

# AN IMPORTANT DECISION

*concerning Chromium Plating*

of vital interest to every present and  
potential user of the chromium  
plating process    ♣    ♣

ON OCTOBER 20TH, 1931, there was rendered by Judge Edwin S. Thomas, of the District Court of the United States, an Opinion which is of vital interest to every individual or concern who is now practicing, or may contemplate the practice of, the art of commercial chromium plating.

THIS COURT held valid and infringed all claims in suit of U. S. Patent 1,581,188 granted April 20th, 1926 to Colin G. Fink and now owned by UNITED CHROMIUM, INCORPORATED, saying in part, as follows:

*"In view of what has been said supra, all claims in suit are held valid and not inspired by the prior publications or by the prior art and not anticipated by the alleged prior uses."*

COPIES of the complete text of the Opinion are available to those interested.

UNITED CHROMIUM, INCORPORATED will continue the policy of Licensing under its patents.

UNITED CHROMIUM, INCORPORATED

Executive Office: 51 East 42nd Street, New York City

DETROIT

SAN FRANCISCO

WATERBURY





# METALLIZING

...now has  
former cost



## Your plant needs this novel European process

**O**VERSEAS the Metallizing process is widely used to coat machinery, metals, wood, plaster and other bases with a protective layer of acid-resisting, non-corrosive metal.

Heretofore the process has been too expensive for American production methods.

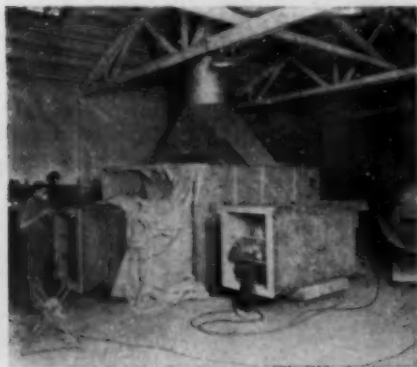
But now a pioneer American company has perfected a new "Metallizer"—a gun which costs half as much as the imported metallizing guns, and works with twice the speed and efficiency.

Now—in every plant where rust is damaging metal—where corrosion from heat, acids or chemicals is eating away metal or machinery—the Metallizer can be used to spray the surfaces with tin, lead, zinc, aluminum, nickel, bronze or almost any

**...to prevent rust  
and corrosion of  
machinery and metals  
...to spray decorative  
metal coatings over  
your products**



Metallizing an acid sludge truck tank with lead for an oil company. Note absence of stripping or any other method of holding lead. Metallizing forms a continuous coating with a perfect bond—far more economical than sheet lead.



Lead spraying the inside of a condenser to resist acid, for the Southwestern Engineering Corp.

other desired metal which is resistant to corrosion.

And in thousands of plants, the products can be coated with metal by the Metallizing process and save the expense of a solid casting of such metal. Wooden articles can be coated to look like solid metal. New finishes can be given to articles, which

are not only decorative, but make the product rust resistant as well.

Now the Metallizing process is so simplified that any workman can use the Metallizer. And there are 1001 uses for Metallizing in every large plant. Besides the obvious anti-corrosive protection to machinery, plant buildings and structures and products, the decorative uses of Metallizing are unlimited. Plaster or sheet metal can be sprayed to look like solid bronze. You can Metallize modernistic metallic decorative motifs in your halls, your entrance and factory exterior—and eliminate repainting expense forever!

Almost all metals are available in wire form. These wires are fed into the Metallizer—a pistol gun—heated, and sprayed under pressure on prepared surfaces. The bond is everlasting. The cost is low.

Full information on the many uses of Metallizing in your industry will be mailed

### Sales Distributors Wanted

If you are in position to sell Metallizers—or to open a Metallizing shop and sell the service as well as the Metallizer—write us. This is a new field and our low prices make sales quickly—for you can easily show any prospect a big saving.

on request. An experienced Metallizing Engineer will be glad to analyze your factory and report in detail on the possible uses and economies of Metallizing—either as applied for you by established Metallizing shops—or the advisability of purchasing your own Metallizer at the new lowest price in history.

Write now—to the Metallizing Co. of Los Angeles, 1218 Long Beach Ave., Los Angeles, California—for full information without obligation.

**METALLIZING CO. OF LOS ANGELES,  
1218 Long Beach Ave., Los Angeles, California.**


Send us full information on the uses and economies of Metallizing and your new Metallizer as applied to our business.

Firm Name .....  
Nature or Kind of Business.....  
Address .....  
City..... State.....  
Mr. ....

December, 1931

# It's Difficult to Injure

## this rugged Alundum "C" Abrasive



**D**ELIBERATE attempts were made to spoil Alundum "C" abrasive by pouring harmful oil over several batches to reduce capillarity. Several tests showed that it required

*six times as much oil to reduce the capillarity of Alundum "C" abrasive as it did to reduce the capillarity of glossy abrasive in the same degree.*

And capillarity is vitally important. Bonding strength between abrasive and glue is decidedly influenced by the degree of capillarity. The lower the capillarity, the less the strength and the weaker the polishing wheel structure.

Alundum "C" abrasive is made with a high capillarity. Tests show it to have a 26% stronger grip than glossy grain at practically any comparative degree of capillarity. It retains this characteristic even under unfavorable conditions. But it is shipped in exclusive, moisture-proof kegs for protection.

**NORTON**  
POLISHING ABRASIVES



W-362  
NORTON COMPANY, WORCESTER, MASS.

New York Chicago Detroit Philadelphia Pittsburgh Hartford  
Cleveland Syracuse Hamilton, Ont. London Paris Wesseling, Germany

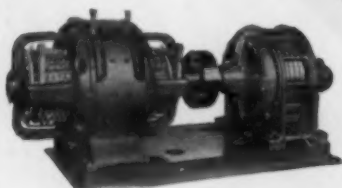


### Why They're Trouble-Proof

The "Wiping Surface" Contactors automatically clean the contact surfaces each time the toggle-action is operated. Double

### "COLUMBIA" PLATING MOTOR- GENERATORS

Cool-running. Sparkless.  
3 Year Brush Guarantee.  
Acid-proof insulation.

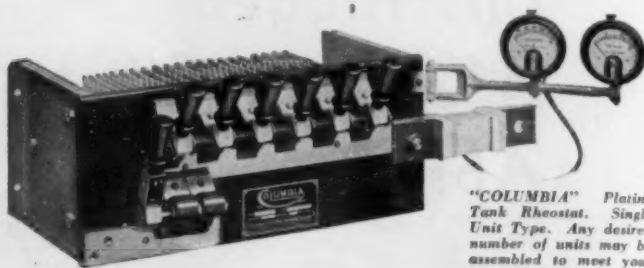


"Columbia" Motor-Generator

Contact Brushes prevent the necessity of passing current through cams, springs, pins or other working parts. This assures freedom from burning and pitting of mechanical details and gives permanently smooth contactor action. The resistor units are rigid grids with ground contact surfaces—no wire spirals to sag or "short"—therefore, permanent resistance value. Made in all sizes from 25 to 10,000 amperes capacity—we build your rheostat to suit your own particular needs.

## PLATING TANK RHEOSTATS for Permanent Accuracy

JUST THINK OVER the many things which can make trouble on an ordinary plating tank rheostat. You'll find we've protected the "Columbia" against ALL OF THEM.



"COLUMBIA" Plating Tank Rheostat. Single Unit Type. Any desired number of units may be assembled to meet your requirements.

Put Your Plating Equipment Problems Up to Us

## Columbia Electric Manufacturing Co.

1295 East 53rd Street

Cleveland, Ohio



**ALWAYS!**

**LOW PRICES  
APPLY TO  
LOW QUALITY.**

**THE ONLY ONE WHO BENEFITS  
THROUGH LOW PRICES  
IS THE MANUFACTURER**

A Complete Test Made With

**MATCHLESS HIGH GRADE  
BUFFING COMPOSITIONS**

Will Prove That

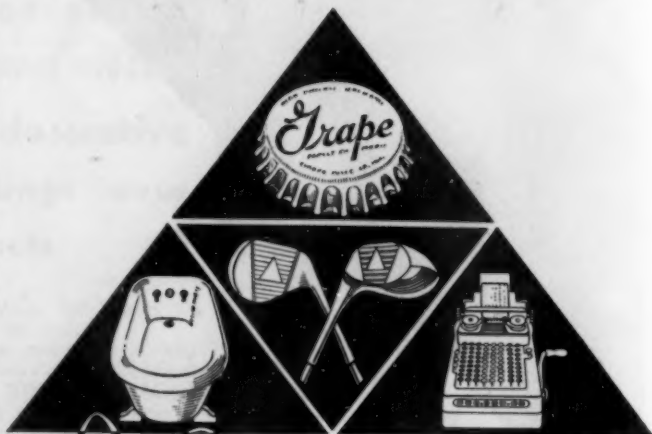
There is no substitute for "MATCHLESS"

The

**Matchless Metal Polish Co.**

840 W. 49th Pl.  
CHICAGO, ILL.

726 Bloomfield Ave.  
GLEN RIDGE, N. J.



*Whether you are*  
**CLEANING** bottle caps or bath  
tubs . . golf clubs or adding machines

**CLENESCO**

has the dirt-getting capacity to do the work.

● Those who want a quick-acting cleaner with plenty of kick, yet one safe to use on the softer metals, will be interested when they see CLENESCO work. ● Tell us your problem and we will tell you what grade to use. A Good Cleaner to do a Good Clean Job.



**SCIENTIFIC  
Cleaning  
PRODUCTION  
SPEED**

© 1931

THE COWLES DETERGENT CO., 7016 Euclid Ave., Cleveland, Ohio

December, 1931



**AT LAST**

**SMIDEL'S SPOTTING OUT  
ELIMINATOR and PROCESS**

(Patent applied for)

Cures Your

**SPOTTING OUT**

Small First Cost

Small Maintenance Cost

Shipped Complete

Small Space Required

Simple to Operate

Satisfy Yourself

*Write for Full Particulars.*

**Crown Rheostat & Supply Co.**

1910 Maypole Ave.

CHICAGO, ILL.



A COMPOUND designed and perfected to successfully establish a chemically clean metal surface.

The true colloidal nature of the base keeps the extractive suspended and dispersed, thereby preventing redeposition.

*Details will be gladly furnished regarding superiority of*

## METEX METAL CLEANER

MANUFACTURED BY

MACDERMID INCORPORATED  
WATERBURY CONNECTICUT



YOU ARE  
**SAFE**  
FROM SCRATCHES  
WHEN YOU

**USE KEYSTONE EMERY**

ASK FOR SAMPLES

**KEYSTONE EMERY MILLS**

4318 Orchard St.

PHILADELPHIA, PA.



**BELKE**  
*Rubber Buckets  
Dippers  
Pitchers*

Hard rubber is the logical composition to be used when handling acids. Belke hard rubber containers are made of the best material. Used for dipping, transferring, testing, emptying and filling tanks and carboys.



## OLD CHIMNEYS REPAIRED

*New Ones Designed and Built*

WITH EXTENSIVE GUARANTEE

Among our customers are some of the best known Railroads, Waterworks; and Coke, Steel, Machinery, Paper, Metal, Chemical and Glass Manufacturers.

Write for Information.

**The NORTHWESTERN  
Chimney Construction Co.**

Fidelity Building

Cleveland, Ohio



*Products that  
economically meet  
every requirement  
of the  
Plating and Polishing  
Industry*

**MUNNING & MUNNING**  
INCORPORATED

N.E. COR. MEMPHIS & TIOGA STREETS  
PHILADELPHIA



December, 1931



## **Your troubles may be beneath the plate!**

**O**IL spots and other dirt not removed from the base metal before plating are often the direct cause of blistering, peeling and pin holes. Perfect plating can be obtained only when the metal is absolutely clean.

By using Oakite Platers Cleaner for this work, you can be sure of a perfect base for the plate. Every trace of foreign matter is removed right down to the metal. Even the angles and corners in complicated castings are reached. And this effective Oakite material rinses freely. No films remain on the metal to cause trouble.

Our nearby Service Man can show you how Oakite cleaning assures better cleaning at lower cost. Write and ask to have him call.

*Oakite Service Men, cleaning specialists, are located in the leading industrial centers of the U. S. and Canada.*

*Manufactured only by*

OAKITE PRODUCTS, INC., 18 Thames St., NEW YORK, N. Y.

**OAKITE**  
TRADE MARK REG. U. S. PAT. OFF.  
**Industrial Cleaning Materials and Methods**



## DO YOU BUY “RESULTS”?



### For Best Results

in plating use anodes and chemicals of unsurpassed quality. For many years this has meant Harshaw Products.

Let us quote on your next order.

Everything for the Plating Tank.



### THE HARSHAW CHEMICAL COMPANY

Manufacturers, Importers, Merchants

General Offices and Laboratories

Cleveland, Ohio

"Quality Products Since 1892"

New York, Philadelphia, Pittsburgh, East Liverpool,  
Cincinnati, Detroit, Chicago, St. Louis, Buffalo.

Factories: Cleveland, Philadelphia, Elyria.

STOCKS IN PRINCIPAL CITIES.

## Christmas Greetings!

AS another year draws to a close, we offer you our best wishes for the Christmas season and for the New Year.

We are appreciative of your friendship and of the patronage you have given us. We pledge our best efforts to make Wyandotte Products and Wyandotte Service of even greater value to you.

As the New Year advances, may it bring you an increasing measure of prosperity and happiness!



**Wyandotte**  
*Clean "Chemically" Clean*  
**Metal Cleaners**

**The J. B. Ford Company**

Wyandotte, Michigan

# "The tanks have met every requirement satisfactorily"



*After 7 years continuous service, four Ace hard rubber lined process tanks are reported in as good condition as when first installed in this Metal Etching plant. Acids handled are muriatic, perchloride of iron and sodium chlorate at temperatures up to 180° F.*

If you are constantly subjected to annoyance and expense due to tanks and parts being attacked by chemicals, enjoy freedom from this heavy over-head burden by rubber lining your present tanks,

or installing Ace rubber lined tanks designed and built to meet your individual problem... We will be glad to quote on your requirements. Information and catalogue on request.

NO TANK IS TOO LARGE FOR US TO PERMANENTLY PROTECT AGAINST CORROSION WITH ACE RUBBER LINING



## AMERICAN HARD RUBBER COMPANY

11 Mercer Street, New York, N. Y. • Akron, Ohio • 111 West Washington Street, Chicago, Ill.

## PORTABLE or STATIONARY Filtering and Pumping Equipment

for Nickel, Copper, Brass, Cadmium, Zinc, Silver or Chrome Plating Solutions, Lacquers, Thinners, Cleaning Solvents and Other Fluids



$\frac{1}{4}$  to 2 H.P. High Capacity Pumps  
300 to 1600 G. P. H. Through Filter on Nickel Solution

### Larger Units Built to Special Order

3 or 4 solutions can be filtered in one machine. Extra sets of filter baffles for each different solution costs but little extra.

Machine is easily cleaned, the baffles need not be lifted out for washing. Renewal bags are low in price and easily changed.

Filters sold separately if you have the pump and motor.

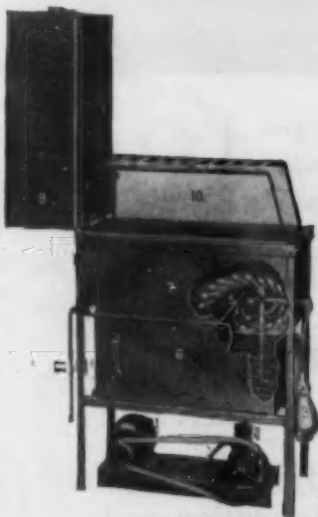
High Head Centrifugal Pumps, for all kinds of service. Bronze or Iron and Direct or Belt Driven.

We will gladly recommend the proper installation and quote prices if you will advise us on the following:

Sizes of Plating Tanks—Solutions to Be Filtered—Current

## Salt Spray Testing Equipment

for Plating Plants, Buyers of Plated Parts or Paint and  
Lacquer Manufacturers



The U. S. Bureau of Standards recommends the salt spray test for testing resistance to corrosion on sheet metals and electro plated metal parts.

Note the simple arrangement of this cabinet. To open simply lift the top half of cabinet from one end, leaving samples on test exposed to full view.

In our equipment you can make tests in a few hours' time that will be more accurate than hanging an article in the open for months to note corrosion.

On production plating, salt spray test a few pieces daily to insure against rejection.

### PRICES

Complete Machine, with $\frac{1}{4}$ H.P. Compressor Unit and Testing Cabinet and Stand	
34" high, 28" long, 13" wide, inside of cabinet.....	\$150.00
24" high, 26" long, 12" wide, inside of cabinet.....	140.00
To operate from your air line, without the compressor unit, deduct.....	35.00

Cabinets of Allegheny Metal, a Chrome Alloy Sheet, well known for its resistance to corrosion. Units require  $1\frac{1}{2}$  cubic feet of air per minute to operate.

## ASPHALTUMS

For protecting the outside or inside of wood or steel tanks, for pickling, plating, rinse, storage or mixing tanks, on warm or cold acid or alkaline liquids and to protect structural steel or sheet metal work against corrosion from acid fumes.

**PAINT**—In Black or Aluminum color. For brushing or spray.

**PLASTICS**—No melting required, for brushing or troweling on, heavy or thick coatings, for repairing and leakproofing wood or cement floors or to mix with sand and gravel for hard asphaltum floors, roof repairs, non-skid floors, etc.

**FLEXIBLE**—Requires melting, to apply in a molten state for heavy and thick coatings.

**MASTIC**—Requires melting and mixing with sand and gravel for hard asphaltum floors.

If you have a flooring, leakproofing or tank lining problem let us give you particulars.

**INDUSTRIAL FILTER & PUMP MFG. CO.,** Not Inc.  
1030 NORTH AVENUE CHICAGO, ILL.



# AHCOLOID METAL CLEANER No. 4

## TRY



## IT!

*and  
Insure a Non-Peeling Chromium Plate*

**APOTHECARIES HALL COMPANY**  
WATERBURY, CONN.

## POOR VISIBILITY

**is a menace to Aviators  
—and Executives**

In this cycle of small unit profits and quick turnover, an expensive handicap is imposed by the failure to recognize methods of cost reduction that can be adapted to your business.

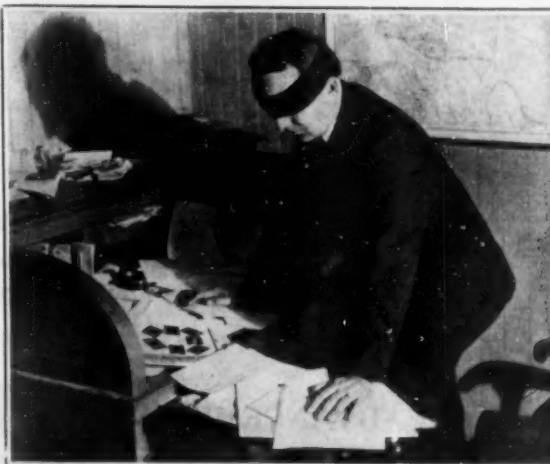
Today, Abbott Ball Burnishing is effecting substantial savings for manufacturers who have thus solved their problem of economically finishing small metal articles. The Abbott Barrel is adapted to finishing a wide variety of shapes and sizes, and these range from small, radio parts to automotive hardware.

Your individual problem will be carefully considered if you will send us a few sample parts.

**THE ABBOTT BALL COMPANY**

*Dependable for Twenty-two Years*

1046 New Britain Ave., Hartford, Conn.



Abbott also manufactures a complete line of heat-treated burnishing materials—available in several sizes of balls, cones, pins, and slugs for greatest efficiency.

The attached coupon provides a convenient way to request the Sample Kit that includes a representative assortment of Abbott Materials.

**THE ABBOTT BALL COMPANY**

1046 New Britain Ave., Hartford, Conn.

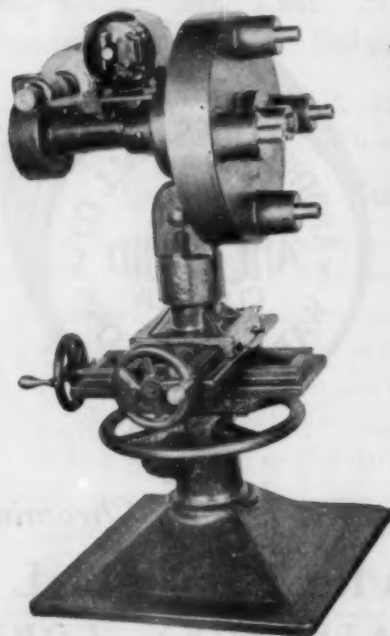
We'd like to inspect an Abbott Sample Kit.

Firm .....  
Address .....  
City and State .....  
Your Name .....

## ANNOUNCING! THE NEW "L-4" ACME AUTOMATIC

### —FEATURES—

- 1 THREE SPEED ADJUSTMENT.
- 2 KNEE ADJUSTMENT FOR ANY ANGLE.
- 3 VERTICAL AND HORIZONTAL ADJUSTMENTS.
- 4 HOLLOW SPINDLES FOR AUTOMATIC RELEASE CHUCKS.
- 5 SIMPLE MECHANICAL MOTION IN AUTOMATIC INDEXING.
- 6 EQUIPPED WITH BALL BEARINGS THROUGHOUT.



**POLISHING and  
BUFFING  
MACHINES**

**25 TYPES**

**SEND US YOUR  
SAMPLES AND  
LET US ADVISE**

*Write for Catalog*

**ACME MFG. CO.**

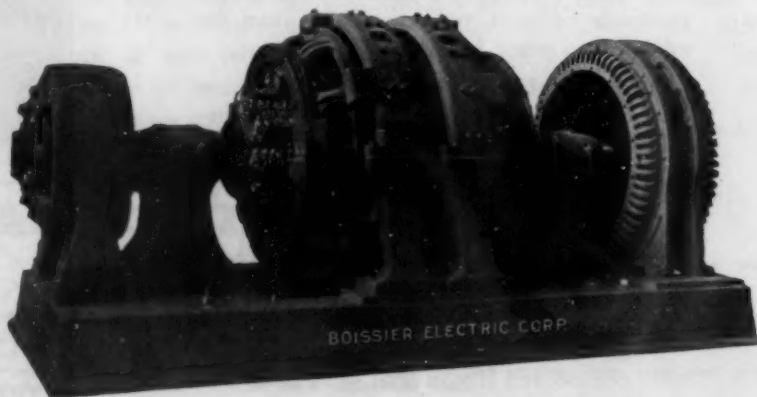
1645 Howard St., Detroit

**25** DEGREE RATING } **CONTINUOUSLY**  
**PERCENT OVERLOAD**

### WE GUARANTEE

25° C. temperature rise at full load and 25% overload in both volts and amperes simultaneously and continuously.

**AN ADVANCEMENT  
TO PUT  
BACKBONE  
IN YOUR  
PLATING DEPT.**



**BOISSIER ELECTRIC CORP., 100 Walker St., New York City**

*Full Equipment and Supplies for Electroplating, Electrotyping and Polishing*  
**DISTRIBUTORS FOR "MATCHLESS" POLISHING AND BUFFING COMPOSITIONS**

# ..Steam! For Processes Automatically Controlled....

The difficulties which ordinarily attend steam processing *can* be eliminated; but it is obvious that they cannot be unless an independent steam source is installed with automatic control. And steam processes in metal treating plants should be automatic for heating solvents, for live steam on joints, metal cleaning, coils, etc. *You do not have to contend with varying pressures, unclean steam, uncertain quantity of flow—*



## KANE boilers furnish it!

KANE Boilers furnish steam automatically. Burning gas, they end fuel problems and delays. Kane Boilers are compact, hence easy to install, even in crowded metal refiners' laboratories (as in the above illustration.) Standard Kane boilers are made for 100 lbs. working pressure, in graduated capacities exactly suited to a wide range of needs. Kane boilers are made by pioneers in automatic gas-boiler control, and they are fool-proof and safe. Our nearest branch office or representative will be glad to give you pertinent engineering data.

*Send for Bulletins*

**MEARS-KANE-OFELDT**

*Executive Offices and Factory*

1903-1915 EAST HAGERT ST., PHILADELPHIA

*Branch Offices or Distributors in principal Cities.*

## STAINLESS STEEL

### POLISHING COMPOUNDS

#### of QUALITY and SPEED

are better because they cut faster, go farther and the finish is superior.

We furnish you with a product for every job—for all kinds of steel, including stainless steel and Radium.

Our Buffing and Polishing Compositions have been standard in the cutlery industry since 1922.

**HARRISON & COMPANY**  
HAVERHILL, MASS.

#### SOME QUALITY COMPOSITIONS

No. 5      4 A A A A      No. 4

Fast Cutting Compounds

In Black and Gray

Soft      Medium      Extra Dry

We Manufacture Wonder Polish

GREEN

LIGHT GREEN

WHITE VELVET

in

Soft      Medium      Extra Dry

For Buffing All Kinds of Materials

Emery Cake

Tripoli Cake



United States Patent Office  
Registered Trade Mark

Our Record Goes Back to 1887

**"A PRODUCT FOR EVERY FINISH"**



## Eliminate Waste and Speed Up Pickling Methods



**K**IRK & BLUM pickling baskets and crates will save money for you. They are designed for more convenient handling and are sturdily built of the proper metal—steel, brass, copper, aluminum, Monel Metal, Nichrome, Durimet, Allegheny, etc.—depending upon your pickling solution. As a result, they last longer, save time, and minimize breakage, rejects, and waste of acids.

We also build special baskets, crates, and lead or rubber lined steel tanks to suit requirements.

*Write for details*

### THE KIRK & BLUM MFG. CO.

*Designers and Manufacturers of Blower Systems, Industrial Ovens, and Industrial Finishing Equipment.*

2839 Spring Grove Ave. Cincinnati, Ohio  
Detroit Factory and Office: 4718 Burlingame  
Chicago Office: 407 S. Dearborn St.

# KIRK & BLUM

PICKLING EQUIPMENT  
BASKETS :: CRATES :: TANKS

## PLATING GENERATORS

### IMPROVED AMERICAN GIANT

Their great overload capacity stability of voltage, extremely long life, and reliability, often permits the selection of a lower rated machine than others would dare recommend.

### CONNECTICUT DYNAMO AND MOTOR CO.

196 Lyons Ave.  
IRVINGTON, N. J.



### BELKE Salt Spray Equipment

In this style of outfit BELKE has given the trade an equipment that combines the highest standard of efficiency in the testing of plating with a conspicuously handsome unit.

The Salt Spray method of testing has been adopted by the U. S. Bureau of Standards. It is recognized throughout the industry as an effective gauge of plating efficiency.



## BOGUE

Builds Modern Highly Efficient

### Electroplating Generators

Dependable

Moderate Cost

WRITE FOR BULLETIN

### Chas. J. Bogue Electric Co.

16th St. and River Front

Hoboken, N. J.

Established 40 Years

December, 1931

# New CROWN

## TYPE "T" TOGGLE SWITCH

# RHEOSTAT



### *Made in all sizes*

- |                |                                                     |
|----------------|-----------------------------------------------------|
| THE TYPE "T"   | Rheostat is not equipped with Voltmeter or Ammeter. |
| THE TYPE "TV"  | Rheostat is equipped with Voltmeter only.           |
| THE TYPE "TVA" | Rheostat is equipped with Voltmeter and Ammeter.    |
| THE TYPE "TA"  | Rheostat is equipped with Ammeter only.             |

Switch  
Closed



Switch  
Open

Switches are held open by powerful springs. The opening and closing of switches imparts a wiping action on the contacts, maintaining a clean contact at all times.

THE CROWN toggle type switch Rheostat enables the Electro-plater to adjust the resistance of a plating tank circuit so as to regulate the ampere density in the plating circuit with the minimum number of switches. The regulation is obtained by manipulation of the various resistance units that are controlled by the switches; all switches being plainly marked as to their capacity in amperes. Thus the plater is able to maintain a constant voltage drop from anode to cathode at any and all changes of cathode surfaces.

All switches are of the toggle type.  
All switches are dead when open.  
All switches are liberally rated for capacity.  
All contacts are made direct on coil supports and bus bars. Maximum number of steps with minimum number of switches.

When toggle switch is closed a heavy pressure is exerted on the brush contact eliminating heating and burning.

All the current is carried by the laminated brush, no current passing through any other part of switch mechanisms.

The ammeter shunts are mounted at end of rheostat to prevent any effect on Ammeter readings from heating.

*For further details write*

## CROWN RHEOSTAT & SUPPLY CO.

1910 MAYPOLE AVE.

CHICAGO, ILL.

December, 1931



## UNIFORMITY

ONE of the larger mid-western manufacturers was experiencing varying results cleaning lead and antimony fittings before silver plating, using phosphate and soda ash.

After trying Magnus a marked uniformity in cleaning results was obtained. The parts were all cleaned perfectly. No "lead scum" formed on them nor did the lead become black if left in the cleaning solution too long. "Soap film," another bugaboo, and all water breaks were completely eliminated. All this resulted in the securing of a uniformly well-bonded plate.

If you are gambling with changing results in your cleaning operations, consider the use of Magnus Cleaning Materials and Methods. No matter what the operation may be, you can always depend upon them for constant results. Uniformity is one of the inherent qualities of all Magnus Materials.

Whether it be uniformity, speed, safety or economy that you desire—a Magnus Survey Report and the book "The Cleaning of Metal" will show you how these may be obtained. Write for these today.



Magnus Products

Over 40 different materials for every industrial cleaning need. Lubricating and anti-rust materials. Used in over 300 industries.

# Magnus

## CHEMICAL COMPANY

(Affiliated with DIF Corporation)

11 South Avenue, Garwood, New Jersey

BETTER CLEANING MATERIALS AND METHODS

FOR A TROUBLE-PROOF FINISH START AT THE BOTTOM

1896

1931

## ORDER U. S. A. BRAND Quality Felt Wheels



and Be Assured of Standard  
Production

### TESTS PROVE

1/4 to 1/3 more parts polished.  
Greater reduction in upkeep charges.  
Less weight per wheel in any hardness.  
Uniform density—no soft spots.

Due to higher quality your first cost per pound is more, but this extra cost is overcome and greater savings shown by the additional wearing qualities of these STANDARD wheels.

For Marble Polishing  
try our JEWEL BRAND

### SHEET FELT

Figure weight per sheet instead of per pound.

Our weight per sheet in any hardness is so much less than others that you could pay us at least 15c. per pound more and still find our total cost per sheet BELOW that of other manufacturers.

### FOR EXAMPLE

Hard Density — 36x36x1/2"

Our Weight:  
13 1/2 lbs.

Others:  
16 lbs.

Figure it out.

## Eastern Felt Company

Manufacturers

Winchester, Massachusetts

December, 1931



## HAVE US REFINE YOUR PLATING ROOM WASTE, SWEEPS, SCRAP. . ETC.

**T**HE same plant and organization that has created and maintained the high standard of 999 "plus" Fine Silver Anodes will do your refining.

Our Bridgeport Plant has complete modern equipment, and skilled men, to thoroughly recover the values from solutions, sweeps, racks, scrap, buff waste, etc., in the largest or smallest lots.

Put your refinings in reliable hands.

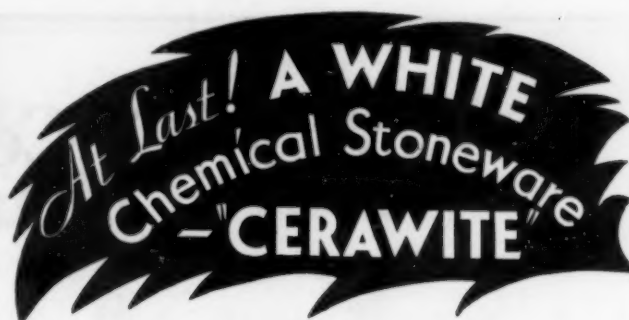
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## HANDY & HARMAN BRIDGEPORT, CONN.

Executive Offices:  
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New York City

Service Plants:  
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Now comes Cerawite—a brand new chemical stoneware as *white* and *attractive* as vitreous china, yet as non-porous and impenetrable by acids and other strongly corrosive substances as the regular brown glazed General Ceramics Stoneware.

"Cerawite" is practically free from iron and is coated with a white acid-resisting glaze, having approximately the same coefficient of expansion as the body.

It can be made up into practically any size or shape of vessel.

Cerawite is vitrified all the way through and does not depend upon the glaze for its acid-resisting properties. Its glass-like surface has no cracks or crevices to harbor odors or germs, consequently there is no danger of contamination of products.

It is scientifically shaped and proportioned safely to withstand mechanical shocks. Lasts indefinitely. Requires no upkeep or repairs.

Cerawite is ideal for use in the food industry, for manufacturers of medicines and pure chemical reagents, for bleaching and dyeing, for use in laboratories, hotels, hospitals, etc.

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# GENERAL CERAMICS CHEMICAL STONEWARE

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With no obligation on our part, you may

- ☐ Send catalog on Cerawite.  
☐ Have your Engineer call.

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Address.....

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*Offices and Factories:*

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**Manufacturers of**

## Buffing and Polishing Wheels

Loose Buffs

Sewed Whole Disc Buffs

Special Sewed Buffs

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*Established*

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HIGHEST



QUALITY

Anodes of all commercial sizes, shapes and percentages

CAST and ROLLED  
99% Plus Pure Nickel

BRASS  
BRONZE  
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MANUFACTURING CO.

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STEINER OVENS for steam, gas, oil or electric heat. Their adaptation to your particular requirements means the utmost in utility and economy.

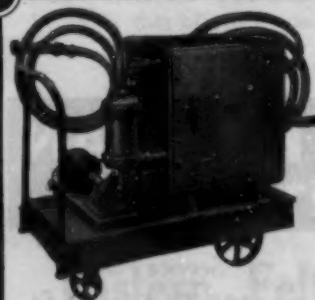
Automatic control if desired.

STEINER INDUSTRIAL FURNACES—KETTLES—TRUCKS—SAWDUST BOXES AND SHEET METAL PRODUCTS.

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**BELKE  
Filters**

For Nickel, Brass, Copper, Cadmium, Silver and Chrome solutions. Capacities 300 to 2400 gallons per hour. Write for prices.

Designed to make cleaning easier. The front cover is removed. This exposes the whole interior and without lifting or detaching screens, the dirt can be flushed out.

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## *Here's another "up-to-the-minute" tumbling outfit by BAIRD*

### **--the new Model A Motor-Driven Oblique Tilting STEAM DRYING Tumbler**

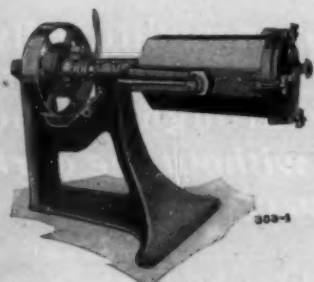


No. 28 BAIRD Model A Right-Hand Single Steam Drying Outfit

The features of simplicity, economy, safety and ease of operation apply equally to this outfit as in the case of the Model A Tumbler.

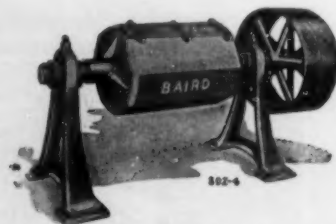
THE mechanical details of this outfit are similar to those incorporated in the new Model A Motor-Driven Oblique Tilting Tumbler. The process of drying, etc., by use of this improved machine is fully explained in BAIRD Catalog No. 301. Write for a copy.

Practically the only difference between the Model A Steam Drying Tumbler and the Model A Oblique Tilting Tumbling Barrel is the barrel and shaft. In the Steam Drying Tumbler, the barrel is jacketed to allow the circulation of low pressure steam with provision for ejecting the condensation. The shaft is arranged to take care of the passage of steam into and the elimination of condensation out of the barrel.



Ball Burnishing Machine

Seventy years of experience in the making and finishing of small metal parts is why we feel warranted in suggesting that you "Ask BAIRD About It" when faced with a problem in the cleaning or finishing of any small, metal products.



Horizontal Tumbler

In addition to making all types of tumbling outfits, The Baird Machine Company is the world's leading designer and builder of Automatic Machines to produce articles from wire and ribbon metal.

**THE BAIRD MACHINE CO.**



**BRIDGEPORT, CONNECTICUT**





No. 12

## OVERCOMES VARIETY PRODUCTION PROBLEMS

### IMPERIAL MULTIPLE COMPARTMENT POLISHING MACHINES

are made to withstand production strains. These machines positively cut polishing costs.

Our machines are made in sizes from two to six compartments.

Unequalled for the manufacturer who wishes to polish a number of different kinds of small parts at one time and keep each kind separate.

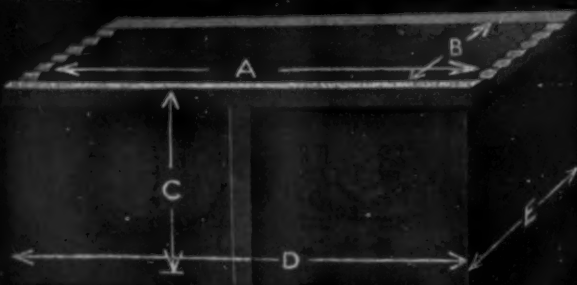
We make seven stock sizes of this machine and can build them in special sizes if requested.

We also build several sizes of single compartment machines and carry a complete stock of steel balls, cones, spickets and soap powder for burnishing purposes.

*We Solicit Articles for Free Demonstration*

**SMITH-RICHARDSON COMPANY**  
ATTLEBORO, MASS.

## ACID-PROOF TANKS



STANDARD SIZES IN STOCK

Gal.	Length	Width	Depth	Code Word	List Price F.O.B. Akron, O.
4	12	9	9	GAMUT	\$10.00
10	16	12	12	GARR	16.00
16	20	16	12	GEAR	22.50
26	24	16	16	GENUS	29.50
38	28	20	16	GIPSY	45.00
41	24	20	20	GLADE	46.00
44	32	20	16	GLAND	55.00
66	32	24	20	GLOSS	68.00
69	40	20	20	GRADE	71.00
104	36	28	24	GRANT	100.00
119	48	24	24	GROAT	109.00

List Prices Subject to Change. Special sizes made to order.

Made of ONE-PIECE, thoroughly vitrified and non-porous acid-proof chemical stoneware; unqualifiedly recommended for pickling work.

Each Tank is unconditionally guaranteed to be acid and corrosion proof throughout the body *with or without the dark brown salt glaze.*

Send for Bulletin No. 222 showing our Dipping, Baskets, Acid Pots, Acid Pitchers, Etc.

**THE U. S. STONEWARE CO.**

40 Church St., New York, N. Y.

# U.S. STONEWARE

ACID-PROOF

# RELIANCE WHEELS and BUFFS

*Serve You Better and Last Longer*

RELIANCE Canvas Wheel



The "Reliance" has been unexcelled for economical polishing for over 30 years. Many of the best judges of Canvas Wheels have pronounced the "Reliance" the most efficient and durable of all Canvas Wheels.

Polishing Wheels and Buffs can be made to order for special processes. The following is a list of standard Reliance Products:—

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Muslin Cloth Wheels  
Sheepskin Wheels

Bull Neck Wheels  
Walrus Wheels  
Chicago Wheels  
(substitute for Felt)  
Atlasta Buffs

Bleached Muslin Buffs  
Unbleached Muslin Buffs  
Fancy Sewed Buffs  
Canton Flannel Buffs  
Reliance Folded Buffs

**QUALITY** *is the first consideration*  
*in the manufacture of* **RELIANCE PRODUCTS**

*Everything for Plating and Polishing*

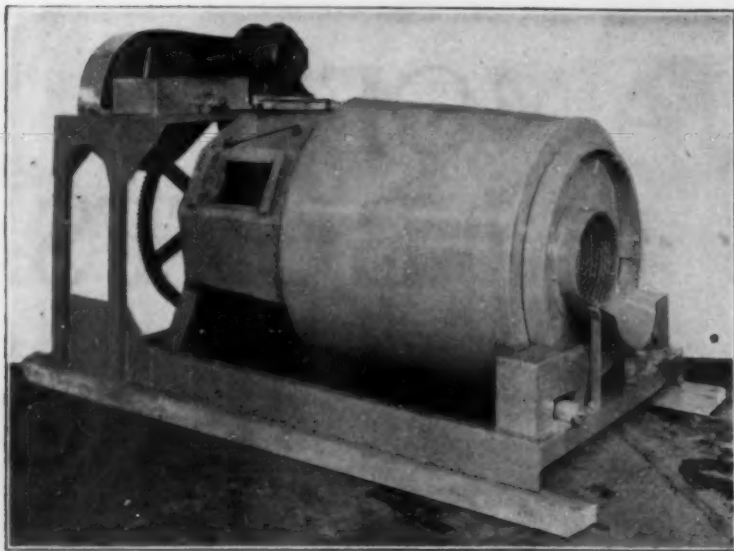
**CHAS. F. L'HOMMEDIEU & SONS CO.**

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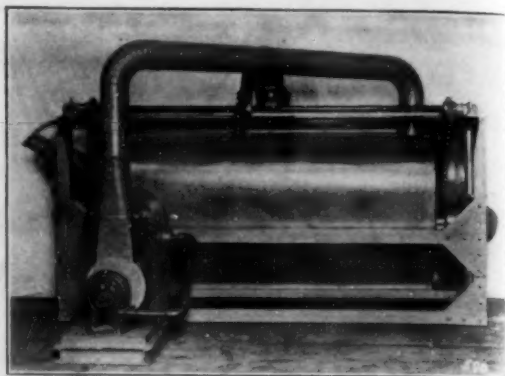
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DEALERS IN PRINCIPAL CITIES



Ideal Burnishing Barrel



Ideal Gas-Heated Air Blast Drier

Burnish, rinse, dry—with practically

**NO LABOR!**

Put it up to  
Specialists.

**N. Ransohoff Incorporated**

West 71st Street at Millcreek, Carthage, Cincinnati, O.

Maybe we can help you reduce your metal cleaning costs—no plant is too small to contain cost-cutting possibilities—let us consider your problem.

## EUREKA DUAL-VALVE SPRAYER

**ROUND OR FLAT SPRAY  
CONTROLLED BY THE TRIGGER**

The round spray is necessary for finishing narrow surfaces.

Why waste material when finishing narrow surfaces or inaccessible corners with a wide flat spray when the Eureka gun permits the operator to change from the *flat spray* for finishing large surfaces to the *narrow round spray* by a movement of the trigger?

No adjustment necessary to make this change.

The operator has both types of spray at his command at all times.

A practical demonstration in your finishing room will show the actual savings made with the Eureka Dual-Valve Sprayer.

REMOVABLE FLUID  
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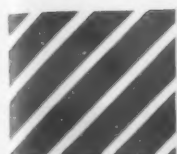
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# ... A Finish That Lasts Is Not a Fad...

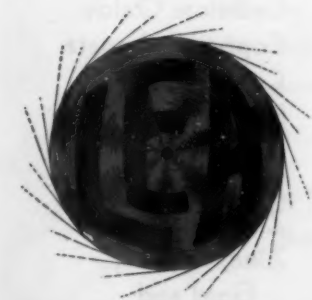
A *Satin Finish* does not show scratches and finger marks. It will withstand abuse and hard usage and endure where other finishes change with the whim and fancy of the times.

Most manufacturers know that imperfections, small casting pores, die marks blend with the satin finish. Silverware, automobile and building hardware, golf clubs, vanity cases, novelties have this finish. Recently our leading Eastern university adopted satin finish metal trim for all the cabinets in their new library.

...and this has been made possible by the Lea Greaseless method of finishing metal... a superior quality with savings of as high as 40% over former methods of metal finishing.

If YOU are unfamiliar with the Lea Greaseless method of metal finishing, outline your job and we will send samples and complete instructions.

THE LEA MANUFACTURING CO.  
WATERBURY CONNECTICUT



# Guard Against Rising Costs of PLATING CHEMICALS By Contracting with *R&H* for Your 1932 Requirements

Consult us about 1932 contracts for:

**SODIUM CYANIDE**

96/98% NaCN

**NICKEL CHLORIDE**

**NICKEL SALTS**, Single and Double

**BICHROMATES**, Soda and Potash

**CHROMIC ACID**, 99¾%

**ALKALIES**

**SAL AMMONIA**, White and Gray

Due to fluctuations of the basic metal market, we are not making contracts on Metal Cyanides and Sodium Stannate.

*Your Inquiries Are Solicited*

Other  
R & H PLATING  
CHEMICALS

Cadmium Oxide  
Copper Carbonate  
Copper Sulfate  
Polysulfide  
Potassium Cyanide  
Zinc Carbonate  
Zinc Sulfate  
Zinc, Copper,  
Gold and  
Silver Trisalyt

*The*  
**ROESSLER & HASSLACHER CHEMICAL COMPANY**  
INCORPORATED

Empire State Building, 350 Fifth Avenue

New York, N. Y.

December, 1931



**The**  
**BUFFING COMPOSITION SUPREME**  
**... for Nickel and Brass Finishes**

There are three ideal pre-chrome grades of buffing compositions available in McAleer's famous WHITE FINISH—grades which have been developed after years of exhaustive experimentation and hand-in-hand co-operation with eminent manufacturers. These grades are:

- M-378 for use on small parts . . . automobile hardware . . . plumbing fixtures . . . produces high color . . . dry.
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- B-202 bumper special . . . flat pieces requiring fast cutter . . . medium greasy.

Our experience in developing buffing compositions for standard or special use—including stainless steel—is at your service. Advise us of your needs; write or wire for samples.

**McAleer Manufacturing Company**  
7401 Lyndon Avenue, Detroit, Michigan

***“Insist on McAleer’s”***



## The Removal of Tripoli From Highly Polished Brass

without tarnishing has long been a difficult problem.

We have, after considerable research, produced a formula which will do this rapidly and efficiently.

This material not only does a perfect job, but saves labor and money. In one large plant, we recently eliminated the services of six operators who were employed removing tripoli by hand.

*Ask us about it.*

The above is but one of the new XCEM products that have been placed on the market recently.

Our representatives will be glad to demonstrate any of our cleaning products without obligation on your part; or you may write to the main office for any information regarding your cleaning problems.



### MAGNUSON PRODUCTS CORPORATION

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*Warehouses in Principal Cities*

*Representatives Everywhere*



(THE FINISH BEAUTIFUL)

## GREEN CROCUS "S"

for Coloring and Finishing:

Carbon Steel      Chromium Plate  
Stainless Steel    Rustless Iron

is basically better in 6 vital features.

1. It clings to the wheel
2. Saves wear on buff
3. Works faster
4. Does not scratch
5. Is hand-rolled and consequently more economical
6. Produces an exceptional finish.

*A sample will prove these points.*

**ZUCKER SONS' CO., INC.**  
ROSELLE, N. J.



Specialists in Lacquers for Metals.

## BUFFING LACQUER

Vitreous Gloss Black Lacquer

Gold Plate Lacquer

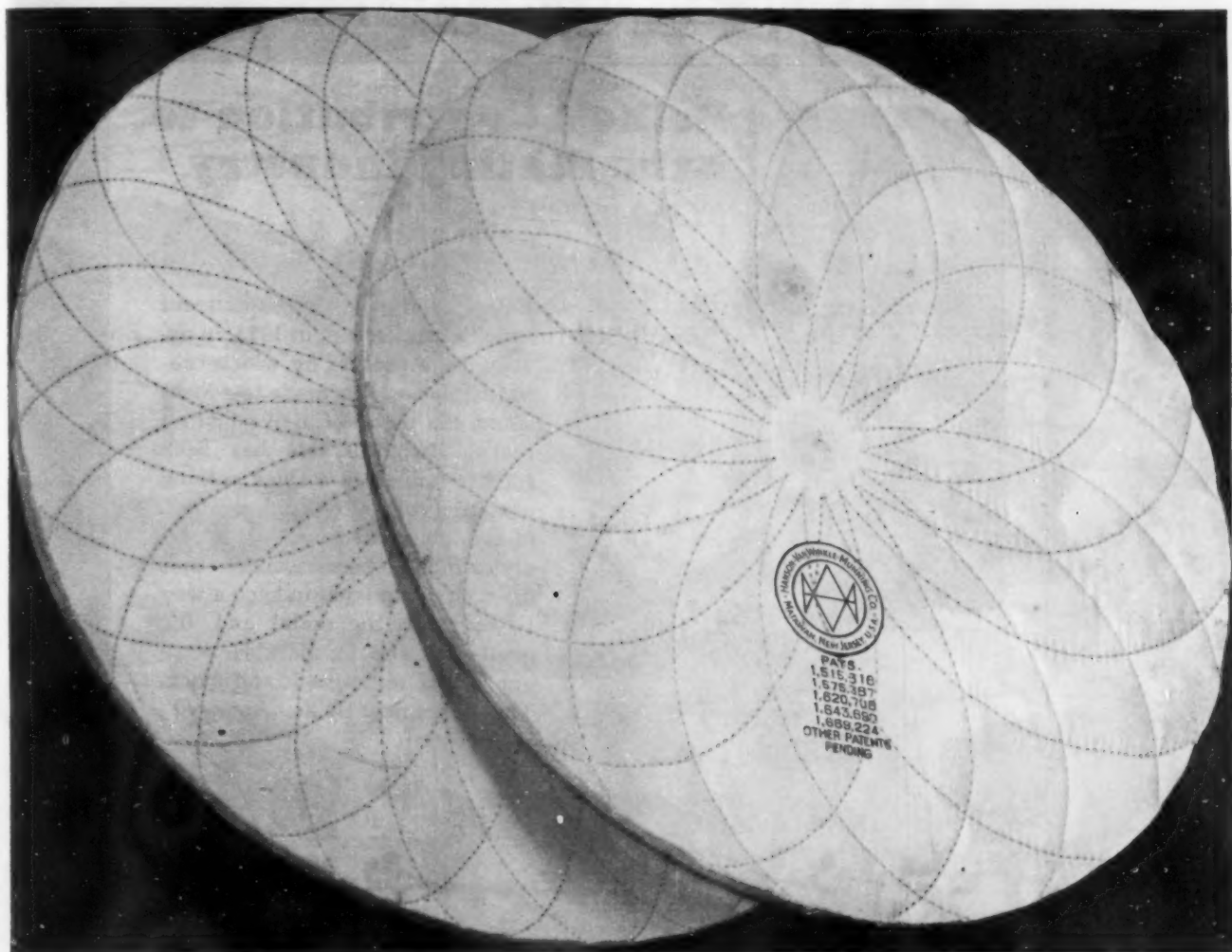
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**Agate Lacquer Mfg. Co.**

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*Agateen—The Last Word in Quality*

# Pieced Buffs



## now PETAL SEWED

Now for the first time, all the economies of pieced buffs for cutting down . . . plus PETAL STITCHING!

"Glazing"—the result of wearing spiral stitched buffs down to the threads—is completely eliminated.

No more "raking". With glazing overcome, raking is a thing of the past.

You now SAVE all the composition and all the buffs that raking formerly wasted.

Furthermore . . . petal stitching gives you the "whipping" action which cuts faster.

Note also . . . H-VW-M petal stitching reduces the size of the pockets as the diameter decreases. In other words—density increases to compensate for reduced peripheral speed.

Again it is H-VW-M that brings you lower buffing costs. This new buff effects such a saving that not a day should be lost in trying it out on your work.

Write, or phone your sample order today. 24 and 32 point styles are standard.



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HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, N. J.

1817

December, 1931

# Belke PLATING EQUIPMENT

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Belke, after years of experiment and trial succeeded, in 1925, in developing a process by which rubber insulation was made to adhere about the metal of Belke plating racks. In 1930 this has been further refined to a thick coating of hard (vulcanite) rubber which is actually coated on, vulcanized, under intense heat, over and into the rack or tip itself in such a way as to make the metal and the insulation one inseparable piece impervious to both acid and shock. This is the new Belke "Armored" construction.



*Belke Rubber Armor cannot become separated from its metal core under ordinary plating conditions. Its adhesion will withstand over 500 pounds of pull per square inch, while acid, air and electricity have no effect upon it.*

### Rubber Armored Plating Racks and Hooks Mean

1. Full efficiency of plating racks at all times.
2. 100% electrical utilization—no loss.
3. 100% non-metal collecting—no loss.
4. Long life of racks—no plate deposits nor corrosion to necessitate discarding.
5. Full concentration of current upon articles being plated.

Our illustrated catalog is at your disposal. It shows every conceivable kind of plating rack and illustrates many applications. Write us today and let us assist you in your racking problems.

Write

**Belke Mfg. Co.**

321 S. California Ave.  
Chicago, Illinois





Rotary Cleaner, Pickle, Acid Dip, Neutralizer, Rinse & Drying Unit.



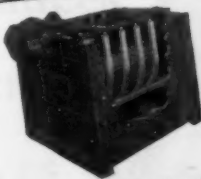
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Automatic Pipe, Tube & Rod Galvanizing or Plating Unit.



Entirely Automatic Cleaning, Plating or Galvanizing & Drying Unit.



Generators and Motor Generator Sets for Plating, Galvanizing, Cleaning, Etc.



Rotary Sae-Dust Dryer & Separator



Drum, Sae-Dust Dryer & Separator



Double Rinse Drum, Sae-Dust Dryer & Separator.

**EQUIPMENT FOR  
PLATING  
ELECTRO-GALVANIZING  
CLEANING  
PICKLING  
ACID-DIPPING  
NEUTRALIZING  
RINSING  
DRYING AND  
ALLIED OPERATIONS**

**ENTIRELY AUTOMATIC  
SEMI-AUTOMATIC  
HAND-OPERATED**

**GENERATORS  
MOTOR-GENERATOR SETS**

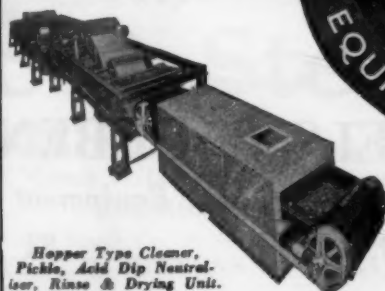
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**Manufacturers  
Incorporated 1896**



Hopper Type Cleaner, Pickle, Acid Dip Neutralizer, Rinse & Drying Unit.



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**PEERLESS**

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**STAINLESS STEEL COMPOSITIONS**

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No. 43—DRY SHARP  
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WRITE FOR SAMPLES

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**THE DANIELS PLATING MACHINE**  
**TYPE F. S.**

Steel Barrel and Bakelite  
Cylinder for Cadmium,  
Hot Brass, Hot Copper and  
other Cyanide Solutions.

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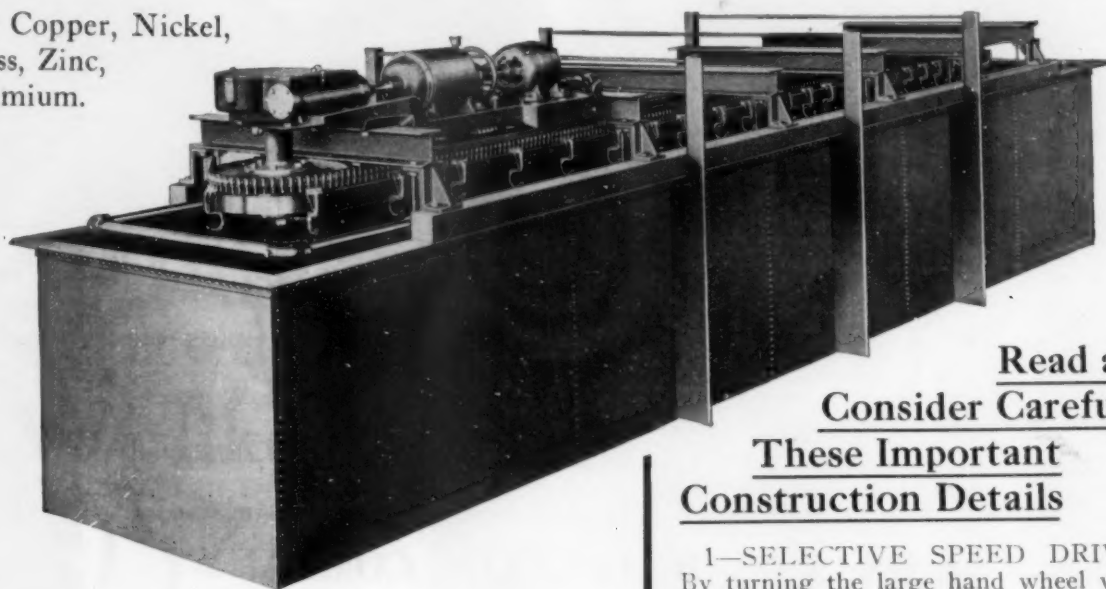
**THE DANIELS & ORBEN CO., Inc.**

*Electro-Plating and Polishing Equipment and Supplies*

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For Copper, Nickel,  
Brass, Zinc,  
Cadmium.



**Read and  
Consider Carefully**

**These Important  
Construction Details**

1—SELECTIVE SPEED DRIVE—By turning the large hand wheel which is clearly shown between the motor and the variable speed device, the speed of the conveyor chain can be instantly adjusted to suit any plating condition. It gives any variation of speed on a ratio of 5 to 1.

2—HOOKS—Each hook has exactly 1 sq. in. of contact on the bus bar and we wish to emphasize that this is a perfect contact under all conditions. The hook spacing may be 3" minimum or on any centers advancing by 1". A very important detail is that the hooks may be changed instantly without any nuts or bolts to adjust.

3—CONVEYOR CHAIN—As the life of any conveyor mechanism and the cost of maintenance is directly in proportion to the quality of the conveyor chain, we use the very highest grade of steel roller chain which we can obtain. The pins and bushings are ground to size and hardened.

4—ELECTRICAL CONNECTIONS—The anode rods and bus bar copper are heavy enough to carry any amount of current that may be necessary for your plating operations.

5—TANKS—We furnish tanks built to specifications and to suit the particular solution which will be used.

# STEVENS

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## Semi - Automatic

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## Plating Machine

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**Saves Floor Space**

**Reduces Your Cost**

**Increases Your Production**

**Gives You Uniform Plating**

Our Special Bulletin, describing both Semi-Automatic and Full Automatic Plating Equipment, will be mailed on request

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Foundry Facings, Supplies and Equipment

Buffing Compositions, Platers' and Polishers' Supplies and Equipment

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## CHROME RACK ENAMEL

When plating with chromium, how do you insulate and protect your Racks to prevent metal deposit?

Chrome Rack Enamel is another specially designed M & W product made for a particular purpose.

It is very easy to apply, dries quickly, and is widely and successfully used. It is not an experiment.

You are invited to write our nearest office for further information.

### MAAS & WALDSTEIN COMPANY

Executive Offices and Plant: 440 Riverside Ave., Newark, N. J.

Chicago Office and Warehouse  
1115 W. Washington Blvd.

Los Angeles Office and Warehouse  
2416 Enterprise Street

*The border of this advertisement is a photographic reproduction of improved M & W Prislac*

"SPRUANCE QUALITY"

## SYNTHO ONE-COAT ENAMELS

Can be sprayed, dipped or brushed, baked or air dried. They produce a complete, satisfactory finish with one coat on metal. They have remarkable adhesion and give an attractive, smooth, tough and elastic finish that withstands the extremes of expansion and contraction and offers unusual resistance to water, grease, oils, gasoline, chemicals, dust, dirt and abrasion. They give better results at lower cost than heretofore has been possible in the finishing of a wide range of articles.

Made in White, Black and a Full Line of Attractive, Practical Colors.

WRITE FOR A FIVE GALLON SAMPLE CAN AT THE DRUM PRICE.  
STATE WHETHER AIR DRYING OR BAKING TYPE IS WANTED.



FINISHING PRODUCTS

THE GILBERT SPRUANCE CO.  
OFFICES — WORKS — LABORATORIES  
Richmond and Tioga Streets  
Philadelphia



PROTECTIVE COATINGS

★

# Will your product look like 1932?

NEW MODELS! Improvements! *Reasons* to buy far more effective than price-cuts, to put your product at the front of returning prosperity!

You have these?

Then let buyers *see* the difference! Vividly. With smart new colors. With richer lustres. With *better finishes!*

The quick eye-appeal sells ten times as fast—even to hard-boiled buyers—as cold reasoned arguments. And the *ultimate* buyer, the public, eats up the eye-satisfaction of a fine finish.

Egyptian Lacquers offer you the help of men who know finishes not only from the technical side, but also as *selling tools*.

Call in the Egyptian representative. He's in the phone book of the cities listed below. In many cases your new finish will prove not only *better* than the old, but *cheaper*.

THE EGYPTIAN LACQUER MFG. CO.  
90 West Street • New York City

Branches in charge of practical men  
maintained in:

Atlanta	Dallas	Portland, Ore.
Boston	Denver	San Francisco
Buffalo	Detroit	Seattle
Chicago	Kansas City	Spokane
Cincinnati	Los Angeles	St. Louis
Cleveland	Philadelphia	

Photograph courtesy Autogiro Company of America



# ZELLAC

"Gentlemen:

**What have you  
in a CHEAP orange  
lacquer enamel with  
excellent hiding properties?"**

We get letters like this every day. Often the writer seems to lose sight of the element of **VALUE**, indicating that he takes quality and fitness for granted.

Of course, it is not possible to produce a lacquer of definite and entire fitness at bargain prices. But Zeller has proved that it **IS** possible to produce *lacquer grades of exact suitability* which at the same time will *achieve lower finishing costs*. The Zeller policy of **VALUE-per-gallon** enables the user to buy lacquer products that are conclusively and indisputably suitable to his purposes, at a selling price which permits low-cost finishing without risk.

Admitted that price in itself means nothing, a "low," "fair" or "high" price depends entirely upon the cost of satisfactory finishing results. The advantages of Zeller **VALUE-per-gallon** materials are that they eliminate production troubles, actually cut labor and final finishing costs, and increase your product's salability. Prove these points in your own plant!

**ZELLER LACQUER MFG. CO., Inc.**  
20 East 49th Street New York City  
CHICAGO WICHITA  
LOS ANGELES SEATTLE SAN FRANCISCO

# ZELLER



## !SPOTTING OUT!

The most practical way to prevent Spotting Out is by the use of a lacquer designed for that purpose.

**OUR NO. 1617  
CLEAR METAL LACQUER  
STOPS SPOTTING OUT**

Tests conducted, and the subsequent use of the lacquer, by scores of manufacturers substantiates our claim.

**THE  
STANLEY CHEMICAL  
COMPANY  
EAST BERLIN, CONN.**

Lacquers—Enamels—Japans

A subsidiary of The Stanley Works, New Britain, Conn.

## For accurate **ACIDITY TESTS** (pH-CONTROL)

and

# NICKEL

DETERMINATION

use the proven

**HELLIGE COMPARATOR**

EMPLOYING PERMANENT COLOR GLASS STANDARDS

No longer is it necessary to depend on fading, and therefore unreliable, liquid standards sealed in easily breakable glass ampoules. Hellige Color Glass Standards are the permanently reliable standards on which you can depend always. Testing with Hellige Comparators is simplicity itself. Just turn the color disc, match the color with the test solution and read the result direct from a figure appearing in the front of the apparatus. Errors impossible. The apparatus is unique in design and offers more conveniences than any other testing outfit ever brought on the market.



Standards never need to be replaced

Over 400,000 Standards in use

Write today for detailed information and folder No. 500-N

# HELLIGE, INC.

179 EAST 87th STREET, NEW YORK, N.Y. U.S.A.

SCIENTIFIC INSTRUMENTS - LABORATORY & BACTERIOLOGICAL SUPPLIES



December, 1931





# Resolution

IN the past twelve months on the pages of this publication, we have enumerated the characteristics which have brought about the growth and expansion of THE ZAPON COMPANY—from its inception in 1884 to the present day.

This growth represents nearly half a century of service, scientific achievement, and consistent customer satisfaction.

Now, we firmly resolve to maintain the high standard of excellence which has always characterized the products of THE ZAPON COMPANY, and continue the rigid scientific research responsible for the perfection of

ZAPON  
PYROXYLIN  
LACQUER

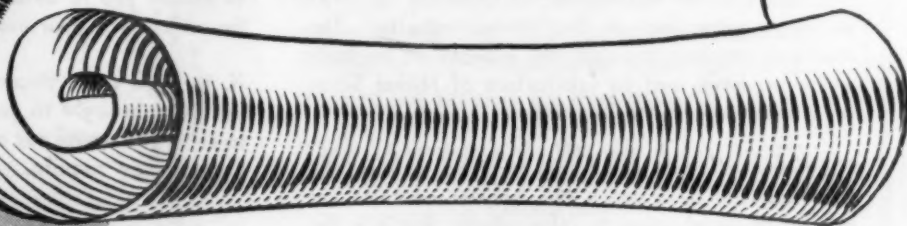


**THE ZAPON COMPANY**

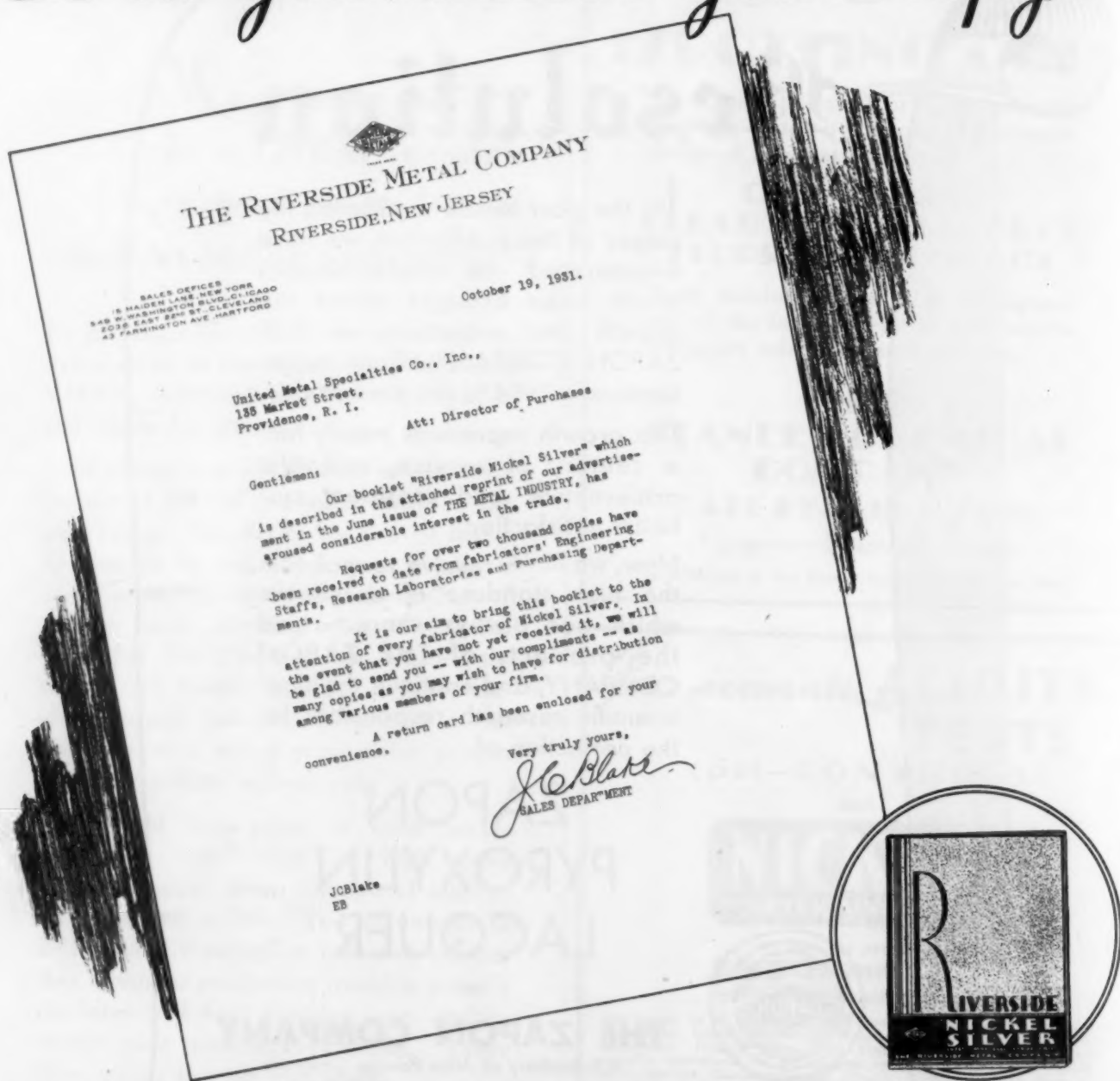
*A Subsidiary of Atlas Powder Company*

**STAMFORD**

**CONNECTICUT**



# Did you receive your copy?



The above letter was mailed on October 19, 1931 to every subscriber of The Metal Industry. The resultant requests brought the number of booklets which we have sent to fabricators of Nickel Silver to a highly gratifying amount.

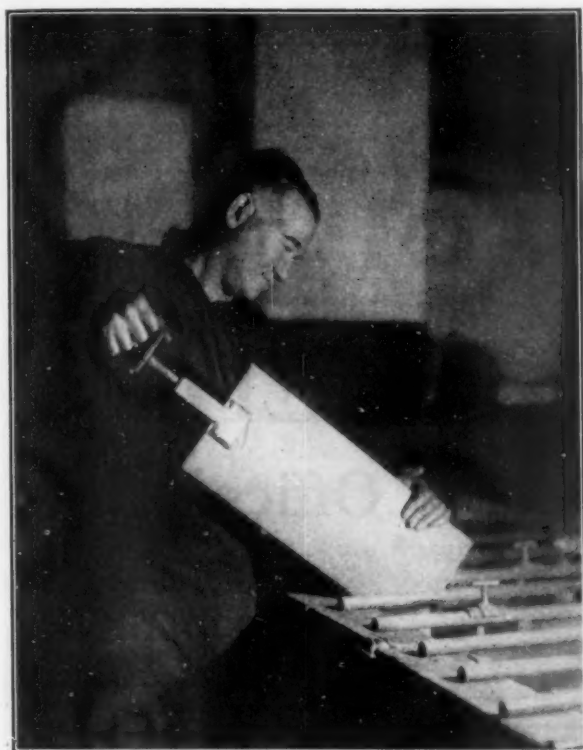
The many voluntary comments received, confirm the fact that the data which this booklet contains has proved of great value to fabricators. For it is the only booklet of its kind available which contains information about Nickel Silver comprehensive enough

to enable you to determine how this metal can best be utilized for your individual requirements.

If, through some circumstance, the booklet has not yet been brought to your attention, we will be glad to send you—with our compliments—as many copies as you may require.

**THE RIVERSIDE METAL COMPANY**  
RIVERSIDE, Burlington County, NEW JERSEY

NICKEL SILVER • SHEET • STRIP • WIRE • ROD • CIRCLES • BARS



The quality of Anaconda Copper Anodes is assured by the supervision of the largest copper-producing organization at every step of production—from ore to finished product.

# ANACONDA COPPER ANODES

*for*

rapid electrolytic  
action . . .

uniform corrosion  
minimum scrap  
losses . . .

EXPERIENCED ELECTROPLATERS prefer Anaconda Copper Anodes . . . because their unexcelled purity assures uniform corrosion, the highest quality deposit in the shortest possible time, and low scrap losses.

Anaconda Oval Copper Anodes—supplied in stock lengths, or cut to length as specified. Anaconda Hot Rolled Copper Anodes—formed from high-oxygen Anaconda Copper over 99.925 per cent pure. Anaconda Electro-Deposited Copper Anodes—produced electrolytically, are 99.99% pure and preferred for certain types of plating. All Anaconda Anodes furnished with suspension holes drilled as desired, or tapped for end hooks.

THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Connecticut

Canadian Mill:

Anaconda American Brass Ltd., New Toronto, Ont.

## ANACONDA COPPER ANODES

December, 1931



**THE  
METAL INDUSTRY**  
WITH WHICH ARE INCORPORATED  
THE ALUMINUM WORLD—COPPER AND BRASS—THE BRASS FORGER AND FINISHER  
ELECTRO-PLATERS REVIEW

**WE HAVE MOVED**  
to Larger and Brighter Offices  
Located at

**116 JOHN STREET  
NEW YORK, N. Y.**

Please direct your mail to the above  
address and if possible call to see us

**PHOSPHORUS**

For Phosphor-Bronze, Copper, Tin, Etc.

**GENERAL CHEMICAL COMPANY**

Liberty Trust Building, 1343 Arch Street, Philadelphia

**Sturt Engineering Corp.**

7001 N. CLARK ST.

CHICAGO

*Designing and Production Engineers*

Specializing on Labor Saving Equipment for Plating  
and Polishing Rooms

Mechanical Platers—Polishers—Washers—Dryers  
AUTOMATIC CHROME PLATER FOR SCREWS AND BOLTS

**Pewter and Kindred White Metal Alloys**

SHEETS AND BLANKS, ROD, WIRE,  
INGOTS FOR CASTINGS

**ALPHA METAL & ROLLING MILLS, INC.**

363 Hudson Ave.

TRIangle 8-4764

Brooklyn, N. Y.



**For Quick and  
Economical Heating**

of Solutions and Water use Gas or  
Electric Heated Insulated Steel Tanks.

*Write for a catalogue*

**FRED HOVER CO.**

1235-37 W. Lake St.,

CHICAGO, ILL.

# DIRECTORY

## Copper, Brass, Aluminum and Other Metal Rolling Mills

MANUFACTURERS OF PLATE, SHEET, ROD, WIRE, TUBE, INGOT, METAL GOODS

### C. G. HUSSEY & CO.

PITTSBURGH, PA.

#### COPPER

Sheets, Rolls, Plates, Anodes, Nails, Spikes.  
Conductor Pipe, Eaves Trough, Elbows and  
Shoes, Boiler Tube Ferrules, Strainers, Mitres,  
Corrugated Gaskets, Rivets, Eaves Trough  
Hangers, Pipe Fixtures.

CHICAGO  
CINCINNATI  
CLEVELAND

DETROIT  
NEW YORK  
PHILADELPHIA

ST. LOUIS

### Hendricks Brothers

INCORPORATED

#### SHEET AND BAR COPPER

Copper Fire Box Plates—Stay Bolts.  
Braziers' Rivets

INGOT COPPER, BLOCK TIN  
Slab Zinc—Lead—Antimony—Bismuth and Nickel

49 CLIFF STREET, NEW YORK

Manufacturers of

### NICKEL SILVER, BRONZE GILDING METAL

LOW BRASS and SPECIAL ALLOYS  
IN SHEET and ROLLS

**WATERBURY ROLLING MILLS, Inc.**  
WATERBURY, CONN.

We Solicit Your Inquiry

### BRASS — BRONZE — COPPER NICKEL SILVER — ZINC PHOSPHOR BRONZE

In gauges .001 and thicker—1/16" to 16" wide

*Tin Coated Metals in Coils and Strips*

**THE BALTIMORE BRASS CO.**  
1201 Wicomico St. Baltimore, Md.

### PHOSPHOR BRONZE SHEET

For Fine Quality Springs

made

BRISTOL

in

CONN.



*Over Eighty Years' Experience*

### BRASS SHEET - ROD - WIRE

*For All Purposes*

PROMPT SHIPMENTS

OFFICES

NEW YORK  
15 Park Row

BOSTON  
683 Atlantic Ave.

**KEEP YOUR NAME BEFORE YOUR INDUSTRY**

*Advertise in THE METAL INDUSTRY*

116 John St., New York, N. Y.

# DIRECTORY

## Lead and Zinc Smelters and Manufacturers

PRODUCERS OF PIG LEAD, SLAB ZINC, ZINC ROD, SHEET ZINC, ACIDS

Anaconda Electric

# ZINC

99.99% Pure



I. L. R. Co.

# LEAD

Desilverized

SELLING AGENTS

## UNITED METALS SELLING COMPANY

25 BROADWAY NEW YORK, N. Y.

### HEGELER ZINC COMPANY

DANVILLE, ILLINOIS

Manufacturers of  
Rolled Zinc-Strips and Coils.

Boiler Plates

Slab Zinc

Sulphuric Acid

# ZINC M & H

SHEET  
PLAIN AND  
CORRUGATED  
&  
RIBBON  
IN  
COILS

BOILER PLATES • ZINC SLABS • SULPHURIC ACID  
**MATTHIESSEN & HEGELER ZINC CO.**  
LA SALLE, ILL.

EASTERN SALES OFFICE  
3415-16 Woolworth Bldg.  
233 Broadway  
NEW YORK

WESTERN SALES OFFICE  
715 N. Y. Life Building  
39 So. La Salle St.  
CHICAGO, ILL.

Special Mixtures to meet all requirements

ZINC BOILER  
PLATE

**ROLLED ZINC**  
SHEETS • STRIPS • COILS



**Hazel-Atlas Glass Co.**  
ROLLING MILLS  
WHEELING, W. VA.

Eastern Sales Office—53 Park Pl., N. Y. C.  
Telephone, BArcley 7-7284

### Get Your Share of Business

Prepare an advertisement and send to

THE METAL INDUSTRY

116 John St., New York

For space rates please write to

THE METAL INDUSTRY

116 John Street

New York City

**RIBBON ZINC** For stamping and drawing

**FUSE METAL** For fuse elements

**ZINC WIRE**

The Platt Bros. & Co., Waterbury, Conn.

December, 1931



# DIRECTORY

## Metal Smelters, Refiners, Dealers

PRODUCERS, ALSO BUYERS AND SELLERS OF NEW AND OLD METALS

OUR PRICES LOWEST ON  
**INGOT COPPER**

PIG OR BAR TIN—HORSEHEAD AND  
BELMONT SPELTER

PIG OR BLOCK LEAD

ALUMINUM INGOT AND ALLOYS  
ALL VIRGIN AND SCRAP METALS IN STOCK  
LABORATORIES ON PREMISES

Belmont Smelting & Refining Works, Inc.  
General Offices: 332 Belmont Ave., Brooklyn, N. Y.  
TEL: GLENmore 4-4400

RARE METALS AND MINERALS BOUGHT  
AND SOLD FOR CASH

Platinum, Osmiridium, Palladium, Silver, Quicksilver,  
Amalgams, Bismuth, Osmium, Rhodium, Ruthenium,  
Mercury Lamps, Tungsten, Molybdenum, Etc.

JOSEF RADNAI

36 FULTON ST.

NEW YORK

METAL SPECIALTIES SINCE 1909

**WE BUY SCRAP**

**N  
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L**

**ANODES—STRIPPINGS**

**ALL METALS**

**RESIDUES—BY-PRODUCTS**

**INDUSTRIAL METAL CO., Inc.**

Smelters and Refiners

85-95 Hyatt Ave.

Newark, N. J.

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A card in this directory will  
give you the needed publicity.

## *If* You Need a Foreman Plater

WRITE OR WIRE

**H. A. GILBERTSON, Secretary**  
**American Electroplaters' Society**

434 South Wabash Ave.

CHICAGO, ILL.

We have a complete list of foremen platers seeking positions,  
who are members of THE AMERICAN ELECTROPLATERS'  
SOCIETY.

These A.E.S. FOREMEN PLATERS can furnish A-1 references.

## Professional Directory

For Advice on or Supervision of  
the  
HEAT-TREATING, CASTING, or  
WORKING of  
STEEL, NON-FERROUS  
DIE-CAST or PRECIOUS **METALS**

Try  
**LUCIUS PITKIN, Inc.**  
*Chemists—Metallurgists—Engineers*  
Pitkin Bldg., 47 Fulton St., New York

A card in this directory will  
give you the needed publicity.

**PLATING** TROUBLES AVOIDED  
BY WEEKLY ANALYSIS  
OF SOLUTIONS

DISTANCE FROM CLEVELAND MAKES NO DIFFERENCE  
SEND FOR FURTHER INFORMATION AND FREE ANALYSIS

*Chemical Testing of Metals, Alloys, Oils, Etc.*

**TEXTOR CHEMICAL LABORATORIES**  
1167 WEST SIXTH STREET CLEVELAND, OHIO

For space rates please write to  
**THE METAL INDUSTRY**  
116 John Street New York City

## Directory of Contract Workers

CASTING, SPINNING, MOLD MAKING, CONTRACT PLATING, ETC.

**WM. BERGFELS & CO.**

391 & 393 MULBERRY ST.

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Spinning in all metals. Oval work a specialty

Tel. Market 8923

Your name and products listed for a  
year in this card will be placed before  
72,000 consumers of your products.

**Books on Metals**  
**Books on Machinery**  
**Books on Plating**

Articles on all  
Related Subjects

Write for full Information

**THE METAL INDUSTRY**

116 JOHN ST., NEW YORK

You Like to Know  
which of your ads  
pays best.

So does the other  
fellow!

When you answer his  
ad, tell him you saw  
it in **The Metal  
Industry.**

116 John Street  
New York

# BUSINESS WANTS

## FOR SALE—EQUIPMENT, ETC.

Display Advertisements, One Column Wide, \$3 per inch, Each Insertion

### FOR SALE

- 1—3000/1000 Amp. 6/12 Volt. "Hanson Van Winkle Co." motor generator set, complete with 20 H.P., 220 V., 3 Phase, 60 Cycle, Induction type motor, separately excited. Excellent condition.
  - 1—1500/750 Amp. 6/12 Volt. A. P. Munning & Co. "OPTIMUS" generator set, complete with 20 H.P. Westinghouse 220 Volt, 3 Phase, 60 Cycle motor. Cannot be told from new. Self excited.
  - 1—1500/750 Amp. 6/12 Volt. "Hanson Van Winkle Co." generator, latest type metal graphite brushes, full commutators.
  - 1—1000/500 Amp. 6/12 Volt. "EAGER" motor generator set, complete with 10 H.P. General Electric, 550 Volt, 3 Phase, 60 Cycle Induction type motor.
  - 4—500 Ampere 6 Volt Hanson-Van Winkle Munning Company. Motor Generator Set, like new.
  - 1—Double Number 2 Baird Ball Burnishing Barrels, Horizontal type, have only been in operation three months. Very latest type.
- Many other makes and sizes in stock, for immediate shipment.  
Burnishing barrels, motor driven lathes, motor driven blowers, etc.

Write for complete details.

**M. E. BAKER COMPANY**

79-81 HAVERHILL ST.

BOSTON, MASS.

**E-G-M**  
GUARANTEED

### Rebuilt Plating Generators

*Big Stock—Quick Delivery—and  
Every Machine Guaranteed*

**WE CAN DELIVER** practically any capacity rebuilt guaranteed plating generator right out of our big stock.

Or, if you prefer it, we'll give your present generator a new lease of useful and efficient life by modernizing it at a low cost.

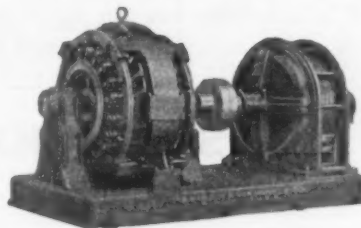
*Write us—We'll Save You Money*

**Electric Generator & Motor Co.**

1295 E. 53rd St.

Cleveland, O.

### Polishing and Plating Equipment



Plating  
Dynamos  
and  
Motor  
Generator  
Sets

ALL SIZES CARRIED IN STOCK

Tumbling and Plating Barrels and almost anything for the Plating Shop.

*Largest Stock of Rebuilt Polishing  
and Plating Supplies in America*

Let us have your requirements. Entire plants or parts thereof bought for cash. Send us your list with prices.

**J. HOLLAND & SONS, INC.**

489 BROADWAY, BROOKLYN, N. Y.

Stagg 8989-5128

Main Store and Office—489 Broadway. Stores—13 Union Ave.  
Yards—39 Johnson Ave. and 445 So. 8th St., Brooklyn.  
Warehouse—41 to 49 Johnson Ave.

All supplies and equipment reconditioned and guaranteed equal to new—estimates cheerfully given.

### FOR SALE

Sherardizing outfit for sale in good condition. Will sacrifice at a very low price.

**UNIVERSAL PLATING CO.**

870 Richards St.

Milwaukee, Wis.

A For Sale Ad in The Metal Industry  
will sell your used equipment.

## INQUIRIES AND OPPORTUNITIES

For further particulars address THE METAL INDUSTRY, 116 John Street, New York City

Inquiry No. 3797—We are seeking information as to what firms in the East are in a position to furnish cast iron trims in the Bar Barff black finish. We would also be interested in knowing what equipment is available on the market for turning out this finish.

Inquiry No. 3798—Please tell me the names of manufacturers equipped to make small stamped or molded ornaments for the ends of 3/4-inch tubes and rods such as spear points and fancy designs, including the popular angles of modernistic style.

Inquiry No. 3799—We are contemplating installing automatic equipment for feeding small brass and rubber parts to punch presses, milling machines, gear cutting machines, etc., and would appreciate your sending us a list of manufacturers of such equipment.

Inquiry No. 3800—Can you please give us the names of firms manufacturing polishing and plating equipment for tin plate (tin-coated iron) sheets about 28" x 30". Also someone that manufactures or sells tanks and any other equipment that goes with same.

## WANTED—EQUIPMENT, ETC.

**CASH FOR SURPLUS**—Chemicals, Oils, Gums, Metals, Waxes, Glues, Lacquers, Solvents. Novelties, plating materials, etc.

**BY-PRODUCTS, RESIDUES, SLUDGES, WASTES, ORES, Etc.**

**CHEMICAL SERVICE CORPORATION**

38 PARK ROW

NEW YORK, N. Y.

**WANTED**—Used Automatic Polishing and Buffing Unit for use with Polishing Jacks. Must be in good condition.

**W. C. CHAPMAN,**

508 Chestnut Hill, Baltimore, Md.



# BUSINESS WANTS

## SITUATIONS OPEN

Display Advertisements, One Column Wide, \$3 per inch, Each Insertion

### SUPERINTENDENT

**SITUATION OPEN**—Superintendent for silver hollow-ware shop employing sixty people. Must understand all branches of work. State age, experience and salary. Address Sixty, care of THE METAL INDUSTRY.

## SITUATIONS WANTED

Display Advertisements, One Column Wide, \$1 per inch, Each Insertion

### PRACTICAL FOUNDRYMAN

**SITUATION WANTED**—An expert practical foundryman, very active, experienced in aluminum, brass, who can locate and overcome trouble, hold costs to a minimum and understands short cuts in foundry practice; can handle large or small production.

Address XXX

Care of THE METAL INDUSTRY.

### FOREMAN PLATER

**SITUATION WANTED**—By a foreman plater with a very broad experience in the art of the electro-deposition of metals and their finishes. Have had a special training in maintaining a uniform color of bright brass deposits where many large brass solutions are operated. Plating experience includes the electro deposition of chromium, cadmium, gold, silver, nickel, brass, copper, zinc, tin and lead upon ferrous and non-ferrous metals, also lacquering, ball burnishing, tumbling and barrel plating of small parts. Gilt-edged references as to character and ability can be furnished.

Address METALPLASTIQUE,  
Care of THE METAL INDUSTRY.

### FOREMAN PLATER

**SITUATION WANTED**—By a foreman plater, not a self-styled expert, but a man with executive ability, thorough practical knowledge and twenty-five years' experience upon gold, silver, bright silver, nickel, black nickel, brass, bronze and copper plating, coloring, oxidizing and bronzing upon both soft and hard metals, thoroughly experienced upon silverware, art metal novelties, ecclesiastical goods, casket hardware, builders' hardware, ornamental brass and iron plumbing and bathroom supplies and antimonial lead novelties, familiar with salt water gilding, ormolu gold, French gray and mechanical plating. Can furnish high-grade references. For further information address

ELECTRO

Care of THE METAL INDUSTRY.

**SITUATION WANTED**—By a foreman plater who would like to connect with a progressive firm who is interested in obtaining only the highest grade results. Capable of supervising and handling a large electro-plating department. Has been accustomed in volume production, can take complete charge and be responsible for production and costs. With a thorough, practical and theoretical knowledge of all the standard and special solutions, by the full automatic, semi-automatic still tank and mechanical processes. Combined with a sound knowledge in analytical chemistry, permitting the actual control of the solutions and maintaining normal conditions at all times. Have had 30 years' experience, of which 20 years has been served as foreman and general foreman and is qualified to instruct inexperienced operators in all branches of metal finishing, using all modern methods. Will reduce production costs, increase production and eliminate waste without sacrificing quality. Past experience covers hardware, lamps, electric appliances, bank lock and trunk lock work. The applicant is capable, resourceful and accomplished, obtaining results. Desires a permanent connection with a reliable concern, which would be more desirable than a large salary. Can furnish best of references from reliable concerns. Willing to locate anywhere.

TRUNK LOCK, Care of METAL INDUSTRY.

### FOREMAN PLATER

**SITUATION WANTED**—By a foreman plater with executive ability and a wide range of practical knowledge and over 20 years' experience in all its branches upon both hard and soft metals such as auto hardware, art metal novelties, plumbing and bathroom supplies, ornamental brass, etc., by still, barrel and automatic methods. Also thoroughly experienced with bright nickel and chrome deposits, and specialized in plating zinc, brass, die castings of all descriptions. The writer wishes to make a good, permanent connection with any reliable concern, large or small, at a moderate salary. Can furnish best of references as to character and ability. Address

J. M.

Care of THE METAL INDUSTRY.

**SITUATION WANTED—METALLURGIST**; plant superintendent or operator; experienced in smelting and in specialized lines of foundry work; has had responsible charge of operation and crews, and secures co-operation of foremen; degrees both in Arts and Engineering; available now. Address

S. F., care of THE METAL INDUSTRY.

**SITUATION WANTED**—First-class hollow-ware plaster or metal pattern, mould and die maker desires change where one can advance on their ability. Twenty years' experience.

Address CONFIDENTIAL, care of THE METAL INDUSTRY

### PLATER

**SITUATION WANTED** by Plater—27 years' experience; all metals, plated or stained finishes. Capable of taking charge or installing plating and polishing department.

STAINED,

Care of THE METAL INDUSTRY.

**SITUATION WANTED**—Plater with 25 years' experience desires position. Thoroughly acquainted with gold, silver, platinum, chromium, rhodium, fancy finishes and colors.

FANCY FINISHES, care of METAL INDUSTRY

# BUYERS' GUIDE: ADVERTISERS' PRODUCTS

(Advertisers are entitled to one listing for each sixteenth page of space)

## ABRASIVES (Also see Emery.)

**Alundum**  
Norton Co., Worcester, Mass.  
**Artificial**  
General Abrasive Co., Niagara Falls, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Zucker Sons Co., Inc., Elizabeth, N. J.

**Emery**  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harrison & Co., Haverill, Mass.  
Keystone Emery Mills, Philadelphia, Pa.  
McAler Mfg. Co., Detroit, Mich.  
Pangborn Corp., Hagerstown, Md.  
Stevens, Inc., Frederic B., Detroit, Mich.

## ACCUMULATORS, HYDRAULIC (Also see Hydraulic Machinery.)

### ACID PIPE

American Hard Rubber Co., New York, N. Y.  
Belke Mfg. Co., Chicago, Ill.

### ACID PROOF COCKS

American Hard Rubber Co., New York, N. Y.  
General Ceramics Co., New York, N. Y.

### ACID PROOF PIPE

General Ceramics Co., New York, N. Y.  
U. S. Stoneware Company, New York.

### ACID

Resistance, Hard Rubber  
American Hard Rubber Co., New York, N. Y.  
Belke Mfg. Co., Chicago, Ill.

### ACIDITY TESTING APPARATUS

Hellige, Inc., New York.

### ACIDS

**Boric**  
Harshaw Chemical Co., The, Cleveland, Ohio.  
McGean Chemical Co., Cleveland, Ohio.

**Chromic**  
Chas. Cooper & Co., New York.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
The McGean Chemical Co., Cleveland, Ohio.

**Hydrofluoric**  
General Chemical Co., Philadelphia, Pa.  
Harshaw Chemical Co., The, Cleveland, Ohio.

**Oil of Vitriol (Sulphuric)**  
Hegeler Zinc Co., Danville, Ill.  
Zapon Co., The, New York, N. Y.

### AEROPLANE DOPE

Egyptian Lacquer Co., New York.  
Zapon Co., The, New York, N. Y.

### AGITATORS FOR PLATING SOLUTIONS

Belke Mfg. Co., Chicago, Ill.  
**Mechanical**  
Belke Mfg. Co., Chicago, Ill.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

### AIR BRUSHES, COMPRESSORS AND ACCESSORIES (See Sprayers; Spraying Accessories.) (Inquire)

The Metal Industry, New York.

### AIR FILTERS

Kirk & Blum Mfg. Co., The, Cincinnati, Ohio.

### AIR PUMPS

Leiman Bros., New York.

### ALLOYS (See also Kind Wanted.)

**Non-Ferrous**  
American Brass Co., Waterbury, Conn.  
Duriron Co., The, Dayton, Ohio.  
Riverside Metal Co., Riverside, N. J.  
Standard Rolling Mills, Inc., Brooklyn, N. Y.  
**Brass, Bronze, Nickel, Silver**  
American Brass Co., Waterbury, Conn.  
Riverside Metal Co., Riverside, N. J.

### ALUMINUM PROCESS

### ALUMINUM (See Ingots, Sheets, Wire Rods, etc.)

**Sheet**  
Straus Aluminum Co., New York.

### ALUMINUM CLEANER

Hesse & Gumm Chemical Co., Irvington, N. J.  
Magnus Chemical Co., Garwood, N. J.

### AMMETERS (See also Electrical Apparatus and Equipment.)

Columbia Elec. Co., Cleveland, O.  
Connecticut Dynamo & Motor Co., Irvington, N. J.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Chas. F. L'Hommedieu & Sons, Chicago, Ill.  
Electric Products Co., The, Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

### AMYL ACETATE

Egyptian Lacquer Co., New York.  
Maas & Waldstein Co., Newark, N. J.  
Spruance, Gilbert Co., Philadelphia, Pa.  
Zapon Co., The, New York, N. Y.

## ANNEALING FURNACES

**Electric**  
**Oil or Gas**  
Monarch Engineering & Mfg. Co., Baltimore, Md.  
Rockwell, W. S., Company, New York.

## ANODES

**All Metals**  
Grasselli Chemical Co., Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
Chas. F. L'Hommedieu & Sons, Chicago, Ill.  
The McGean Chemical Co., Cleveland, Ohio.  
Munning & Munning, Philadelphia, Pa.  
U. S. Galvanizing & Pltg. Equip. Corp., Brooklyn, N. Y.

### Brass and Bronze

Apothecaries Hall Co., Waterbury, Conn.  
Daniels & Orben Co., Inc., New York.  
Grasselli Chemical Co., Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
MacDermid Incorporated, Waterbury, Conn.  
The McGean Chemical Co., Cleveland, Ohio.  
Seymour Mfg. Co., Seymour, Conn.  
Stevens, Inc., Frederic B., Detroit, Mich.

### Cadmium

American Cyanamid Co., New York.  
Grasselli Chemical Co., Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
McGean Chemical Co., The, Cleveland, Ohio.  
Roessler & Hasslacher Chemical Co., New York, N. Y.  
Udylite Process Co., Detroit, Mich.

### Copper

American Brass Co., Waterbury, Conn.  
Apothecaries Hall Co., Waterbury, Conn.  
Daniels & Orben Co., Inc., New York.  
Grasselli Chemical Co., Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
Hussey, C. G. & Co., Pittsburgh, Pa.  
L'Hommedieu, Chas. F. & Sons Co., Chicago, Ill.  
MacDermid Incorporated, Waterbury, Conn.  
The McGean Chemical Co., Cleveland, Ohio.  
Seymour Mfg. Co., Seymour, Conn.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Stutz, Geo. A., Mfg. Co., Chicago, Ill.

### Lead

Grasselli Chemical Co., Cleveland, Ohio.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

### Nickel

Apothecaries Hall Co., Waterbury, Conn.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Grasselli Chemical Co., Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
Lassco, Inc., St. Louis, Mo.  
MacDermid Incorporated, Waterbury, Conn.  
The McGean Chemical Co., Cleveland, Ohio.  
Seymour Mfg. Co., Seymour, Conn.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Stutz, Geo. A., Mfg. Co., Chicago, Ill.

### Platinum

Jackson, John J., Co., Newark, N. J.

### Tin

Harshaw Chemical Co., The, Cleveland, Ohio.  
The McGean Chemical Co., Cleveland, Ohio.

### Zinc

Apothecaries Hall Co., Waterbury, Conn.  
Grasselli Chemical Co., Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
L'Hommedieu, Chas. F. & Sons Co., Chicago, Ill.  
The McGean Chemical Co., Cleveland, Ohio.  
Roessler & Hasslacher Chemical Co., New York, N. Y.  
Stutz, Geo. A., Mfg. Co., Chicago, Ill.

## ANTI-FRICTION METAL (See also Babbitt Metal and Bearings.)

Ajax Metal Co., Philadelphia, Pa.

## ASSAY CRUCIBLES, Sand

Joseph Dixon Crucible Company, Jersey City, N. J.  
Plumbago Crucible Association, The, New York.

## ASSAYERS AND CHEMISTS (See also Testing Laboratories.)

Ledoux & Co., New York.  
Pitkin, Lucius, Inc., New York.  
Textor Chem. Labs., Cleveland, Ohio.

## AUTOMATIC METAL CLEANING MACHINES

N. Ranschoff, Inc., Cincinnati, Ohio.

## AUTOMATIC POLISHING MACHINES

Acme Mfg. Co., Detroit, Mich.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## AUTOMATIC WIRE AND SHEET METAL WORKING MACHINERY

Baird Machine Co., Bridgeport, Conn.

## BABBITT METAL (See also Bearings.)

Ajax Metal Co., Philadelphia, Pa.  
Standard Rolling Mills, Inc., Brooklyn, N. Y.

## BABBITT MOLDS (See Molds.)

## BALL BURNISHING EQUIPMENT (Also see Burnishing and Polishing Barrels.)

Abbott Ball Co., Hartford, Conn.  
Baird Machine Co., Bridgeport, Conn.  
Globe Machine & Stamping Co., Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Hartford Steel Ball Co., The, Hartford, Conn.  
N. Ranschoff, Inc., Cincinnati, Ohio.

## BALLS & SPECIAL SHAPES—STEEL

Abbott Ball Co., Hartford, Conn.  
Hartford Steel Ball Co., The, Hartford, Conn.

## BASKETS, DIPPING

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Kirk & Blum Mfg. Co., The, Cincinnati, Ohio.

## BATH TESTING APPARATUS

Hellige, Inc., New York.

## BEARINGS (Also see Babbitt metal and Anti-Friction Metal.)

**Babbitt**  
Ajax Metal Co., Philadelphia, Pa.

## BENCH SPEED LATHES

Leiman Bros., New York.

## BENCH TOPS, ASBESTOS & METAL

Leiman Bros., New York.

## BENCHES, ENGRAVERS, LAPIDARY LATHES, SETTERS, POLISHING, VISE, WIRE, DRAWER WORK

Leiman Bros., New York.

## BLAST GATES

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## BLOCK TIN PIPE

Standard Rolling Mills, Inc., Brooklyn, N. Y.

## BLOWERS AND BLOW PIPING (See also Exhaust Fans and Heads.)

Astle, H. J., & Co., Providence, R. I.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.  
Monarch Engineering & Mfg. Co., Baltimore, Md.

## BLOWERS AND EXHAUSTERS

General Ceramics Co., New York, N. Y.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.  
Leiman Bros., New York.

## BLOWERS, HIGH PRESSURE

Leiman Bros., New York.

## BLOWERS, PORTABLE ELECTRIC

## BOILER INSULATION (See Brick, Insulating; Insulating Cement.)

## BOILERS GAS FIRED

Mears Kane Ofeldt, Philadelphia, Pa.

## BOILERS, STEAM

Mears Kane Ofeldt, Philadelphia, Pa.

## BOILERS, SETTING (See Fire Cement.)

## BRASS (See Brass Mill Products; Wire Mill Products; Anodes; Castings; Die Castings; Forgings; Ingots; Rods and Bars; Sheets; Strip Metal; Tubes; Wire.)

## BRASS FINISHERS' SOAP

Magnus Chemical Co., Garwood, N. J.

## BRASS FOUNDERS (See Castings.)

## BRASS MILL ENGINEERS (See Engineers.)

## BRASS MILL MACHINERY (Also see kind Wanted.)

## BRASS MILL PRODUCTS

American Brass Co., Waterbury, Conn.  
Baltimore Brass Co., Baltimore, Md.  
Riverside Metal Co., Riverside, N. J.  
Seymour Mfg. Co., Seymour, Conn.

## BRASS ROLLING MILL MACHINERY

Schloemann Eng. Co., Pittsburgh, Pa.  
Torrington Mfg. Co., Torrington, Conn.  
United Eng. & Fdry. Co., Pittsburgh, Pa.

## BRASS, SHEET, WIRE, ROD, TUBE (Also see Wire Mill Products; Rods and Bars; Sheets; Strip Metals; Tubes; Wire, Etc.)

American Brass Co., Waterbury, Conn.  
Bristol Brass Co., Bristol, Conn.  
Conklin, T. E., Brass & Copper Co., New York.  
Hendricks Bros., New York.  
Riverside Metal Co., Riverside, N. J.  
Seymour Mfg. Co., Seymour, Conn.  
Western Cartridge Co., Alton, Ill.  
Waterbury Rolling Mills, Waterbury, Conn.



# BUYERS' GUIDE: ADVERTISERS' PRODUCTS

(Advertisers are entitled to one listing for each sixteenth page of space)

## BRASS WORKING LATHES (See Lathes.)

## BRIGHTENERS (For Plating Solutions.)

Hanson-Van Winkle-Munning Co., Matawan, N. J.

## BRITANNIA METAL

Alpha Metal & Rolling Mills, Inc., Brooklyn, N. Y.  
Standard Rolling Mills, Inc., Brooklyn, N. Y.

## BRONZE (See Also Anodes; Castings; Forgings; Ingots; Powdered; Rods and Bars; Tubes, Etc.)

Western Cartridge Co., Alton, Ill.  
Bearing  
American Brass Co., Waterbury, Conn.  
Phosphor, Tobin, Manganese  
American Brass Co., Waterbury, Conn.  
Conklin, T. E., Brass & Copper Co., New York.  
Riverside Metal Co., Riverside, N. J.

## BRONZING LIQUID

Egyptian Lacquer Co., New York.  
Spruance, Gilbert, Co., Philadelphia, Pa.  
Zapon Co., The, New York.  
Zeller Lacquer Mfg. Co., New York.

## BRUSHES

Hand  
Blumenthal, H. & Co., New York.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Wheel  
Blumenthal, H. & Co., New York.  
Boisier Elec. Corp., New York, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## BUFFING AND POLISHING COMPOSITION

Apothecary Hall Co., Waterbury, Conn.  
Beam-Knodel, Inc., New York.  
Boisier Elec. Corp., New York, N. Y.  
Bruce Products Corp., Detroit, Mich.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Daniels & Orben Co., Inc., New York.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harrison & Co., Groveland, Mass.  
L'Hommedieu, Chas. F. & Sons, Chicago, Ill.  
MacFarland Mfg. Co., New York.  
Matchless Metal Polish Co., Chicago, Ill.—Glen Ridge, N. J.  
McAleer Mfg. Co., Detroit, Mich.  
Munning & Munning, Philadelphia, Pa.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Stuts, Geo. A., Mfg. Co., Chicago, Ill.  
Zucker Sons Co., Inc., Roselle, N. J.

## BUFFING AND POLISHING MACHINES

Acme Mfg. Co., Detroit, Mich.  
Columbia Elec. Co., Cleveland, O.  
Electric Products Co., The, Cleveland, Ohio.

## BUFFING MACHINES

(See Polishing and Buffing Machines.)

### Electric

Acme Mfg. Co., Detroit, Mich.  
Columbia Elec. Co., Cleveland, O.  
Divine Bros. Co., Utica, N. Y.  
Electric Products Co., The, Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## BUFFING MACHINES, AUTOMATIC (Also see Polishing Lathes and Heads.)

Acme Mfg. Co., Detroit, Mich.  
Columbia Elec. Co., Cleveland, O.  
Divine Bros. Co., Utica, N. Y.  
Hammond Machinery Builders, Inc., Kalamazoo, Mich.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## BUFFING AND POLISHING WHEELS (Also see Buffs.)

Canvas, Cotton, Etc.  
Codman, F. L. & J. C., Co., So. Boston, Mass.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Daniels & Orben Co., Inc., New York.  
Divine Bros. Co., Utica, N. Y.  
Eastern Felt Co., Winchester, Mass.  
Hammond Machinery Builders, Inc., Kalamazoo, Mich.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Lea Mfg. Co., The, Waterbury, Conn.  
L'Hommedieu, Chas. F. & Sons, Chicago, Ill.  
MacFarland Mfg. Co., New York, N. Y.  
Munning & Munning, Philadelphia, Pa.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Yerges Buff Co., Fremont, Ohio.

### Felt

Codman, F. L. & J. C., Co., So. Boston, Mass.  
Divine Bros. Co., Utica, N. Y.  
Eastern Felt Co., Winchester, Mass.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
MacFarland Mfg. Co., New York, N. Y.  
Yerges Buff Co., Fremont, Ohio.

### Leather

Hanson-Van Winkle-Munning Co., Matawan, N. J.

### Sheepskin

Codman, F. L. & J. C., Co., So. Boston, Mass.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## BUFFS (Also see Buffing and Polishing Wheels.)

Codman, F. L. & J. C., Co., So. Boston, Mass.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Divine Bros. Co., Utica, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
L'Hommedieu, Chas. F. & Sons, Chicago, Ill.  
MacDermid Incorporated, Waterbury, Conn.  
MacFarland Mfg. Co., New York, N. Y.  
Munning & Munning, Philadelphia, Pa.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Stuts, Geo. A., Mfg. Co., Chicago, Ill.  
Yerges Buff Co., Fremont, Ohio.

## BUFFS, STAINLESS STEEL

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
MacFarland Mfg. Co., New York.

## BURNERS (Also see Furnaces.)

Air and Gas Pre-Mixing  
Monarch Engineering & Mfg. Co., Baltimore, Md.  
Oil or Gas

## BURNISHING AND POLISHING BARRELS

Abbott Ball Co., Hartford, Conn.  
Baird Machine Co., Bridgeport, Conn.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Globe Machine & Stamping Co., Cleveland, Ohio  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Hartford Steel Ball Co., The, Hartford, Conn.  
L'Hommedieu, Chas. F. & Sons, Chicago, Ill.  
Ransohoff, N., Inc., Cincinnati, Ohio.  
Smith-Richardson Co., Attleboro, Mass.  
Stevens, Inc., Frederic B., Detroit, Mich.

## BURNISHING COMPOUNDS AND CHIPS (Also see Soap.)

Abbott Ball Co., Hartford, Conn.  
Beaver, H. Leroy, Philadelphia, Pa.  
Hartford Steel Ball Co., The, Hartford, Conn.  
International Chemical Co., Philadelphia, Pa.  
Magnus Chemical Co., Garwood, N. J.

## BURNISHING MACHINES

Baird Machine Co., Bridgeport, Conn.  
Leiman Bros., New York.  
Smith-Richardson Co., Attleboro, Mass.

## CABLING MACHINERY

Torrington Mfg. Co., Torrington, Conn.

## CADMIUM OXIDE

Apothecaries Hall Co., Waterbury, Conn.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
McGean Chemical Co., The, Cleveland, Ohio.

## CADMIUM PLATING

Grasselli Chemical Co., Cleveland, Ohio.  
Roessler & Hasselacher Chemical Co., New York  
Udylite Process Co., Detroit, Mich.

## CANVAS WHEELS (See Buffing and Polishing Wheels.)

## CASTINGS

Brass, Bronze and Composition  
Ajax Metal Co., Philadelphia, Pa.

## CASTING FLASK

Leiman Bros., New York.

## CAUSTIC SODA

Harshaw Chemical Co., The, Cleveland, Ohio.  
International Chemical Co., Philadelphia, Pa.  
Roessler & Hasselacher Chemical Co., New York  
N. Y.

## CEMENT (See Fire Cement; Insulating Cement)

## CENTRIFUGAL DRYERS AND EXTRACTORS (Also see Drying-Out Machines)

## CENTRIFUGAL PUMPS

American Hard Rubber Co., New York, N. Y.  
General Ceramics Co., New York, N. Y.

## CHEMICALS, DEALERS IN ALL KINDS (Also see Kind Wanted.)

Platers  
Cooper & Co., Chas., New York.  
Grasselli Chemical Co., Cleveland, Ohio.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
McGean Chemical Co., The, Cleveland, Ohio.  
Roessler & Hasselacher Chemical Co., New York  
N. Y.  
Platers and Galvanizers Equipment  
C. R. Galvanizing & Plating Equip. Corp., Brooklyn, N. Y.

## CHEMISTS, CONSULTING (See Assayers and Chemists; Testing Laboratories.)

Ledoux & Co., New York  
Tetter Chem. Labs., Cleveland, Ohio.

## CHLORIDE

### Nickel

Harshaw Chemical Co., The, Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
McGean Chemical Co., The, Cleveland, Ohio.

## CHROMIC ACID

Grasselli Chemical Co., Cleveland, Ohio.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
McGean Chemical Co., The, Cleveland, Ohio.  
Roessler & Hasselacher Chemical Co., New York, N. Y.

## CHROMIUM PLATING

Hover Co., Fred, Chicago, Ill.  
Metal & Thermit Corp., New York.

## CHROMIUM PLATING EXHAUST SYSTEMS

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## CHROMIUM PLATING MACHINERY

Connecticut Dynamo & Motor Co., Irvington, N. J.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## CHROMIUM PLATING FUMES EXHAUST SYSTEMS

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## CHROMIUM PLATING POLISH

Bruce Products Corp., Detroit, Mich.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harrison & Co., Groveland, Mass.  
L'Hommedieu, Chas. F. & Sons, Chicago, Ill.  
Matchless Metal Polish Co., Glen Ridge, N. J.—Chicago.  
McAleer Mfg. Co., Detroit, Mich.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Zucker Sons Co., Inc., Roselle, N. J.

## CHUCKING MACHINES, AUTOMATIC

Baird Machine Co., Bridgeport, Conn.

## CHUCKS

Oval  
Prybil, P., Machine Co., New York.  
Spinning  
Prybil, P., Machine Co., New York.

## CLEANERS, METAL

Ford, J. B., Co., Wyandotte, Mich.  
Fuller, W. A., Co., Greensburg, Pa.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
International Chemical Co., Philadelphia, Pa.  
L'Hommedieu, Chas. F. & Sons, Chicago, Ill.  
MacDermid, Inc., Waterbury, Conn.  
Magnus Chemical Co., Garwood, N. J.  
Magnuson Products Corp., Brooklyn, N. Y.  
Oakite Products, Inc., New York, N. Y.  
Sulphur Products Co., Greensburg, Pa.  
Udylite Process Co., Detroit, Mich.

## CLEANING APPARATUS, AUTOMATIC METAL (Also see Pickling Machines.)

Ransohoff, N., & Co., Cincinnati, Ohio.  
Tolhurst Machine Works, Inc., Troy, N. Y.

## CLEANING COMPOUNDS (See also Fig Cleaner; Pickling Compounds, Whale Oil Soaps.)

### Metal

Apothecaries Hall Co., Waterbury, Conn.  
Cowles Detergent Co., Cleveland, Ohio.  
Ford, J. B., Co., Wyandotte, Mich.  
Fuller, W. A., Co., Greensburg, Pa.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
Hesse & Gumm Chem. Co., Irvington, N. J.  
International Chemical Co., Philadelphia, Pa.  
MacDermid, Inc., Waterbury, Conn.  
Magnus Chemical Co., Garwood, N. J.  
Magnuson Products Corp., Brooklyn, N. Y.  
Matchless Metal Polish Co., Chicago, Ill.—Glen Ridge, N. J.  
Munning & Munning, Philadelphia, Pa.  
Oakite Products, Inc., New York, N. Y.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Sulphur Products Co., Greensburg, Pa.

## CLEANING SYSTEMS

(Vacuum)  
Allington & Curtis Co., Saginaw, Mich.

## COCKS

Acid Proof  
Durlon, The, Co., Inc., Dayton, Ohio.

## COLLECTING SYSTEMS (Dust, Shavings, Sawdust, Dust Metal.)

Allington & Curtis Co., Saginaw, Mich.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## COMPARATOR SETS

Heilige, Inc., New York.

## COMMUTATORS

Belke Mfg. Co., Chicago, Ill.  
Columbia Electric Mfg. Co., Cleveland, Ohio.



# BUYERS' GUIDE: ADVERTISERS' PRODUCTS

(Advertisers are entitled to one listing for each sixteenth page of space)

## COMPOSITION METAL (See Castings; Ingot, Etc.)

Greaseless, for Metal Finishing  
Lea Mfg. Co., The, Waterbury, Conn.

## COMPOSITIONS (See Buffing and Polishing Composition; Flooring Composition.)

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harrison & Co., Haverhill, Mass.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.  
MacFarland Mfg. Co., New York.  
Matchless Metal Polish Co., Glen Ridge, N. J.—Chicago.

McAleer Mfg. Co., Detroit, Mich.  
Stevens, Inc., Frederic B., Detroit, Mich.

## COMPOUNDS, CUTTING AND GRINDING DRAWINGS, STAMPING

International Chemical Co., Philadelphia, Pa.  
Magnus Chemical Co., Garwood, N. J.  
Magnuson Products Corp., Brooklyn, N. Y.  
Oakite Products, Inc., New York, N. Y.

## COMPRESSORS, AIR & GAS (See Air Compressors.)

## CONCENTRATING TABLES (See Reclaiming Machinery.)

## CONTRACT PLATING (All Kinds.)

Nelkin Plating Works, New York, N. Y.

## CONTROLLERS

## CONVEYING SYSTEMS (Pneumatic Light Materials.)

Allington & Curtis Co., Saginaw, Mich.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## COPPER (Also see Anodes; Castings; Ingots, Rods and Bars; Sheets; Smelters and Refiners; Strip Metal; Tubes; Wire, Etc.)

Sheet, Wire, Rod, Tube  
American Brass Co., Waterbury, Conn.  
Conklin, T. E., Brass & Copper Co., New York.

## COPPER BEARING MATERIAL, BUYERS OF (See Drosses, Residues, Etc.)

## COPPER, CARBONATE OF

Cooper, Chas., & Co., New York, N. Y.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Daniels & Orben Co., Inc., New York.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.  
McGean Chemical Co., The, Cleveland, Ohio.  
Roessler & Hasslacher Chemical Co., New York, N. Y.

## COPPER-CYANIDE

American Cyanamid Co., New York.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
Roessler & Hasslacher Chemical Co., New York, N. Y.  
Zapon Co., The, New York, N. Y.

## CORE MACHINES

Stevens, Inc., Frederic B., Detroit, Mich.

## CORE OIL AND COMPOUNDS

Stevens, Inc., Frederic B., Detroit, Mich.

## CORE OVEN INSULATION (See Brick Insulating; Insulating Cement; Insulating Oven.)

## CORE OVENS

Coal and Coke  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.  
Monarch Engineering & Mfg. Co., Baltimore, Md.  
Steiner Oven & Equipment Co., Newark, N. J.  
Stevens, Inc., Frederic B., Detroit, Mich.

Oil and Gas

Kirk & Blum Mfg. Co., Cincinnati, Ohio.  
Monarch Engineering & Mfg. Co., Baltimore, Md.  
Stevens, Inc., Frederic B., Detroit, Mich.

## COUPLES

Dixon, Joseph, Crucible Co., Jersey City, N. J.

## CRUCIBLES, METAL MELTING

Chicago-Naugatuck Crucible Co., Shelton, Conn.  
Dixon, Joseph, Crucible Co., Jersey City, N. J.  
Lava Crucible Co., of Pittsburgh, Pittsburgh, Pa.  
McCullough-Dalsell Crucible Co., Pittsburgh, Pa.  
Plumbago Crucible Association, The, New York.  
Ross Tacony Crucible Co., Tacony, Philadelphia, Pa.

Stevens, Inc., Frederic B., Detroit, Mich.  
Vesuvius Crucible Co., Swissvale, Pa.

## CRUSHERS AND PULVERIZERS (See also Reclaiming Machinery.)

Farrel-Birmingham Co., Inc., Ansonia, Conn.  
Standard Equipment Co., New Haven, Conn.

## CUPOULETTES

Monarch Eng. & Manufacturing Co., Baltimore, Md.

## CUPRO-NICKEL (See Brass Mill Products) CUTTING, STRAIGHTENING, FORMING & EXTRUDING MACHINERY

Wire

Baird Machine Co., Bridgeport, Conn.  
Strip Metal

Baird Machine Co., Bridgeport, Conn.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Schloemann Eng. Co., Pittsburgh, Pa.

## CYANIDES

American Cyanamid Co., New York.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## CYANIDE SORE HEALER

Wambaugh, E., Co., Goshen, Ind.

## CYANIDE OF SODIUM

Harshaw Chemical Co., The, Cleveland, Ohio.  
Roessler & Hasslacher Chemical Co., New York.

## DIE CASTINGS—(Inquire The Metal Industry)

## DIPPING BASKETS

Dipping and Plating

American Hard Rubber Co., New York.  
General Ceramics Co., New York.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.  
U. S. Stoneware Co., New York.

Stoneware

General Ceramics Co., New York.  
U. S. Stoneware Co., New York.

## DRAW BENCHES

Wire, Rod, Tube

Farrel-Birmingham Co., Inc., Ansonia, Conn.  
Leiman Bros., New York.

## DRAWING AND STAMPING (See Metal Goods Made to Order; Stamping and Drawing.)

## DRILLS

## DROP LIFTERS (See also Presses, Drop Lifters for.)

Automatic

## DROSSES, RESIDUES, ETC., BUYERS OF (Also see Metal Dealers, Old.)

## DRYERS (See Centrifugal Dryers; Ovens Drying-Out Machines; Ladle Heater and Dryers; Mold Dryers; and Dryers Sawdust Drying-Out Boxes.)

Tolhurst Machine Works, Inc., Troy, N. Y.

## DRYING-OUT MACHINES (See also Centrifugal Dryers and Extractors; Sawdust Drying-Out Boxes.)

Baird Machine Co., Bridgeport, Conn.  
Smith-Richardson Co., Attleboro, Mass.  
Tolhurst Machine Works, Inc., Troy, N. Y.

Automatic

Astle, H. J., & Co., Providence, R. I.

## DUST ARRESTORS

Cloth Screen

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## DUST COLLECTORS AND VENTILATING SYSTEMS (Also see Exhaust Fans and Heads.)

Astle, H. J., & Co., Providence, R. I.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## DUST COLLECTING OUTFIT, POLISHING

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

Leiman Bros., New York.

## DYNAMOS, LOW VOLTAGE, PLATING AND GALVANIZING (Also see Electrical Apparatus and Equipment.)

Bogue, Chas. J., Electric Co., New York, N. Y.  
Boissier Elec. Corp., New York, N. Y.  
Chandeysson Electric Co., St. Louis, Mo.  
Columbia Electric Mfg. Co., Cleveland, Ohio.  
Connecticut Dynamo & Motor Co., Irvington, N. J.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Electric Products Co., The, Cleveland, O.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Stutz, Geo. A., Mfg. Co., Chicago, Ill.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## DYNAMOS, PLATING, USED

Baker & Co., Boston, Mass.  
Boston Plating Supply Co., Boston, Mass.  
Fuerst-Friedman Co., Cleveland, Ohio.  
Holland, J., Sons, Brooklyn, N. Y.  
Pan Electric Co., St. Louis, Mo.

## ELECTRIC CRANES (See Cranes.)

## ELECTRIC FURNACES

Melting

Ajax Metal Co., Philadelphia, Pa.

## ELECTRIC OVENS (See Ovens; also Core Ovens.)

## ELECTRICAL APPARATUS AND EQUIPMENT (Also see Ammeters, Rheostats, Switchboards, Transformers, Voltmeters.)

Bogue, Chas. J., Electric Co., New York.  
Columbia Electric Co., Cleveland, Ohio.

## ELECTRICAL CONDUCTORS

U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## ELECTRO GALVANIZING EQUIPMENT AND SUPPLIES (See Dynamos, Plating Barrels; Plating Machines, Automatic; Tanks, Etc.)

Columbia Electric Mfg. Co., Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## ELECTRO PLATING EQUIPMENT AND SUPPLIES (See also Kind Wanted.)

Beam-Knodel, Inc., New York.  
Boissier Elec. Corp., New York, N. Y.  
Chandeysson Elec. Co., St. Louis, Mo.  
Columbia Electric Mfg. Co., Cleveland, Ohio.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Daniels & Orben Co., Inc., New York.  
Electric Products Co., The, Cleveland, O.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.  
Matchless Metal Polish Co., Glen Ridge, N. J.—Chicago.  
Munning & Munning, Philadelphia, Pa.  
Stevens, Inc., Frederic B., Detroit, Mich.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## ELECTRO PLATING, JOB & CONTRACT (Also see Polishing and Burnishing; Plating, Barrel Method.)

National Sherardizing & Machine Co., Hartford, Conn.

## ELECTRIC POLISHING AND SCRATCH BRUSH MACHINES

Leiman Bros., New York.

## ELECTRO PLATING BATH TESTING APPARATUS

Hellige, Inc., New York.

## ELECTRO PLATING & GALVANIZING BARRELS

Beam-Knodel, Inc., New York.  
Boissier Elec. Corp., New York, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## ELECTRO PLATING TANKS

General Ceramics Co., New York, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
U. S. Stoneware Co., New York.

## ELECTROTYPING EQUIPMENT & SUPPLIES

Boissier Elec. Corp., New York, N. Y.  
Columbia Electric Mfg. Co., Cleveland, Ohio.  
Electric Products Co., The, Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## EMERY (Also see Abrasives.)

Crown Rheostat & Supply Co., Chicago, Ill.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Keystone Emery Mills, Philadelphia, Pa.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.  
MacFarland Mfg. Co., New York.  
Matchless Metal Polish Co., Chicago, Ill.—Glen Ridge, N. J.  
McAleer Mfg. Co., Detroit, Mich.  
Stevens, Inc., Frederic B., Detroit, Mich.

## EMERY PASTE

Bruce Products Corp., Detroit, Mich.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harrison & Co., Haverhill, Mass.  
Matchless Metal Polish Co., Glen Ridge, N. J.—Chicago.  
McAleer Mfg. Co., Detroit, Mich.

## ENAMELING OVENS (See Ovens.)

## ENAMELS

Colored

Agate Lacquer Co., Long Island City, N. Y.  
Egyptian Lacquer Co., New York.  
Maas & Waldstein Co., Newark, N. J.  
Spruance, Gilbert, Co., Philadelphia, Pa.  
Zapon, The, Co., Stamford, Conn.  
Zeller Lacquer Mfg. Co., New York.

# BUYERS' GUIDE: ADVERTISERS' PRODUCTS

(Advertisers are entitled to one listing for each sixteenth page of space)

**Lacquer**  
Agate Lacquer Co., Long Island City, N. Y.  
Egyptian Lacquer Co., New York.  
Maas & Waldstein Co., Newark, N. J.  
Roxalin Flexible Lacquer Co., Long Island City, N. Y.  
Spruance, Gilbert, Co., Philadelphia, Pa.  
Zapon, The, Co., Stamford, Conn.  
Zeller Lacquer Mfg. Co., New York.

**Wood**  
Agate Lacquer Co., Long Island City, N. Y.  
Egyptian Lacquer Co., New York.  
Maas & Waldstein Co., Newark, N. J.  
Roxalin Flexible Lacquer Co., Long Island City, N. Y.  
Spruance, Gilbert, Co., Philadelphia, Pa.  
Zapon, The, Co., Stamford, Conn.  
Zeller Lacquer Mfg. Co., New York.

## ENAMEL SPRAYERS (See Sprayers.)

## ENGINEERS

Buffing and Polishing  
Divine Bros. Co., Utica, N. Y.  
Chromium Plating  
Connecticut Dynamo & Motor Co., Irvington, N. J.  
Furnace  
Monarch Engineering & Mfg. Co., Baltimore, Md.  
Plating  
Connecticut Dynamo & Motor Co., Irvington, N. J.

**ENGINEERS, POLISHING AND GRINDING**  
Divine Bros. Co., Utica, N. Y.  
Sturt Engineering Co., Chicago, Ill.

## ENGRAVER BENCHES

Leiman Bros., New York.

## EQUIPMENT

Chromium Plating  
Chandeysson Electric Co., St. Louis, Mo.  
Connecticut Dynamo & Motor Co., Irvington, N. J.  
Electric Products Co., The, Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.  
Munning & Munning, Philadelphia, Pa.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.  
Electro Plating  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## ETHYL ACETATE

Egyptian Lacquer Co., New York.  
Zapon Co., The, New York, N. Y.

**EXHAUST FANS AND HEADS (Also see Blowers and Blow Piping; Dust Collectors and Ventilating Systems.)**  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.

**Acid Proof**  
Duriron, The, Co., Inc., Dayton, Ohio.

## EXHAUST SYSTEMS

Allington & Curtis Co., Saginaw, Mich.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## EXTRUDED SHAPES

Brass, Copper and Bronze  
Conklin Brass & Copper Co., T. E.

## EXTRUSION MACHINERY

Schloemann Eng. Co., Pittsburgh, Pa.

## FACINGS (See Foundry Facings.)

## FANS (Exhaust.)

Allington & Curtis Co., Saginaw, Mich.  
Columbia Electric Mfg. Co., Cleveland, Ohio.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## FEEDERS (Furnace, Wood Waste.)

Allington & Curtis Co., Saginaw, Mich.

## FELT, POLISHING

Eastern Felt Co., Winchester, Mass.

## FELT POLISHING WHEELS

Codman, F. L., & J. C., Co., So. Boston, Mass.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Divine Bros. Co., Utica, N. Y.  
Eastern Felt Co., Winchester, Mass.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.  
MacFarland Mfg. Co., New York, N. Y.  
Stevens, Inc., Frederic B., Detroit, Mich.

## FELT SHEETS

Eastern Felt Co., Winchester, Mass.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.  
MacFarland Mfg. Co., New York, N. Y.

## FELT WHEELS

Eastern Felt Co., Winchester, Mass.  
MacFarland Mfg. Co., New York, N. Y.

## FERRULES, BRASS AND COPPER

American Brass Co., Waterbury, Conn.

**FIG CLEANERS (Also see Cleaning Compounds, Whale Oil Soap.)**  
International Chemical Co., Philadelphia, Pa.  
Magnus Chemical Co., Garwood, N. J.

**FILTER AERATING & AGITATING SYSTEM**  
Belke Mfg. Co., Chicago, Ill.

**FILTER SYSTEM FOR PLATING SOLUTIONS**  
Belke Mfg. Co., Chicago, Ill.

## FILTER, TANK

Belke Mfg. Co., Chicago, Ill.

## FIRE BRICK (Inquire)

The Metal Industry.

## FIRE CEMENT

Dixon, Joseph, Crucible Co., Jersey City, N. J.  
Lava Crucible Co., of Pittsburgh, Pittsburgh, Pa.

## FLEXIBLE SHAFTS (Inquire)

The Metal Industry.

## FLOORING COMPOSITION (Inquire)

The Metal Industry.

## FLUXES

Soldering and Tinning  
Johnson Mfg. Co., Chicago, Ill.

## FOIL

Tin, Lead & Electrotypes  
Standard Rolling Mills, Inc., Brooklyn, N. Y.

## FOOT POWER GRINDING AND LAPIDARY MACHINES

Leiman Bros., New York, N. Y.

## FOOT POWER GLASS GRINDING MACHINE

Leiman Bros., New York, N. Y.

## FOUNDRY EQUIPMENT AND SUPPLIES (See Kind Wanted.)

## FOUNDRY FACINGS

Dixon, Joseph, Crucible Co., Jersey City, N. J.  
Plumbago Crucible Association, The, New York.  
Stevens, Inc., Frederic B., Detroit, Mich.

## FOUNDRY RIDDLES (See Sand Sifters.)

## FOUNDRY SPRAYERS (See Sprayers.)

## Frictions

Divine Bros. Co., Utica, N. Y.

## FURNACE CEMENT (See also Fire Cement.)

## FURNACE ENGINEERS (See Engineers.)

## FURNACE INSULATION (See Brick Insulating; Insulating Cement; Insulation, Furnace.)

**FURNACES (See Annealing Furnaces; Burners; Electric Furnaces; Galvanizing & Tinning Furnaces; Heat Treating Furnaces; Melting Furnaces; Powdered Coal Burning Furnaces; Sherardizing Furnaces; Smelting Furnaces.)**  
Ajax Metal Co., Philadelphia, Pa.  
Fisher, Alfred, Furnace Co., Cicero, Ill.  
Monarch Engineering & Mfg. Co., Baltimore, Md.

## FURNACE TILE AND LININGS (Also see Fire Brick.)

Monarch Engineering & Mfg. Co., Baltimore, Md.

## FUSE METAL

Platt Bros. & Co., Waterbury, Conn.

## GALVANIZING (See also Electro Galvanizing Job, and Contract; Hot Galvanizing, Job and Contract.)

U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## GALVANIZING AND TINNING FURNACES (Also see Burners.)

Monarch Engineering & Mfg. Co., Baltimore, Md.

## GALVANIZING EQUIPMENT AND SUPPLIES (See Kinds Wanted. Also Plating Galvanizing Machines, Automatic; Hot and Galvanizing Barrels; Plating and Galvanizing and Tinning Equipment.)

Columbia Electric Mfg. Co., Cleveland, Ohio.  
Connecticut Dynamo & Motor Co., Irvington, N. J.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## GAS APPLIANCES

Mears-Kane-Ofeldt, Philadelphia, Pa.

## GAS BURNERS (See Burners.)

## GAS FIRED BOILERS

Mears Kane Ofeldt, Philadelphia, Pa.

## GATE CUTTERS (See Saws: Sprue Cutters.)

## GENERATORS (See Dynamos; Motor-Generator Sets.)

Beam-Knodel, Inc., New York.  
Chandeysson Electric Co., St. Louis, Mo.  
Columbia Electric Mfg. Co., Cleveland, Ohio.  
Connecticut Dynamo & Motor Co., Irvington, N. J.  
Electric Products Co., The, Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.  
Munning & Munning, Philadelphia, Pa.  
Stevens, Inc., Frederic B., Detroit, Mich.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## GLIDING METAL

Riverside Metal Co., Riverside, N. J.

## GLUE FOR POLISHING

Daniels & Orben Co., New York.  
Divine Bros. Co., Utica, N. Y.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

## GLUE HEATERS AND POTS

Divine Bros. Co., Utica, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## GOLD (See Anodes; Bars; Metal Dealers; Smelters and Refiners.)

## GAS PUMPS

Leiman Bros., New York.

## GRAPHITE PRODUCTS, POSPHORIZERS, STIRRERS, ETC. (Also see Crucibles.)

Bartley Crucible & Refractories Co., Trenton, N. J.  
Chicago-Naugatuck Crucible Co., Shelton, Conn.  
Dixon, Joseph, Crucible Co., Jersey City, N. J.  
Lava Crucible Co., Pittsburgh, Pa.  
McCullough-Daisell Crucible Co., Pittsburgh, Pa.  
Plumbago Crucible Association, The, New York.  
Ross-Tacony Crucible Co., Tacony, Philadelphia, Pa.  
Vesuvius Crucible Co., Swissvale, Pa.

## GREASELESS COMPOSITIONS

Lea Mfg. Co., The, Waterbury, Conn.

## GRINDERS

## GRINDERS & BUFFERS

Electric  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## GRINDING MACHINES

Divine Bros. Co., Utica, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Stevens, Inc., Frederic B., Detroit, Mich.

## Electric

Hanson-Van Winkle-Munning Co., Matawan, N. J.

## Portable

## GRINDING WHEEL HOODS (See Dust Collectors and Ventilating Systems; Hoods.)

## HARD RUBBER FITTINGS

American Hard Rubber Co., New York.  
Belke Mfg. Co., Chicago, Ill.

## Pipe

Belke Mfg. Co., Chicago, Ill.

## Hard Rubber Tanks

American Hard Rubber Co., New York.

## HOODS (Also see Dust Collectors and Ventilating Systems.)

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## Polishing and Grinding Wheel

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## HOT GALVANIZING AND TINNING EQUIPMENT (See Burners; Galvanizing and Tinning Furnaces; Kettles; Tanks.)

## HOT TINNING EQUIPMENT (See Hot Galvanizing and Tinning Equipment.)

## HYDRAULIC MACHINERY, PRESSES, JACKS, ETC. (Also see Accumulators, Presses.)

Farrel-Birmingham Co., Inc., Ansonia, Conn.  
Schloemann Eng. Co., Pittsburgh, Pa.

## HYDROGEN ION CONTROL APPARATUS

Hellige, Inc., New York.

## INGOTS (Also see Calcium-Copper; Manganese-Copper; Phosphor-Copper; Phosphor-Tin; Silicon-Copper; Smelters and Refiners.)

Aluminum  
British Aluminum Co., New York and Toronto, Ontario.

Brass, Bronze and Composition  
Ajax Metal Company, Philadelphia, Pa.

Copper  
Hendricks Bros., New York.

Lead  
United Metals Selling Co., New York.

Tin  
Ajax Metal Company, Philadelphia, Pa.

## INSULATING BRICK, BLOCK, POWDER AND CEMENT (See also Brick.)



# BUYERS' GUIDE: ADVERTISERS' PRODUCTS

(Advertisers are entitled to one listing for each sixteenth page of space)

## INSULATING CEMENT, HEAT

The Metal Industry.

**INSULATION** (Also see Brick, Insulating, Insulating Cement.)  
Boiler  
Oven  
Furnace  
Pipe  
American Hard Rubber Co., New York, N. Y.

## IRON CASTINGS (See Castings.)

## JAPAN REMOVERS

Hesse & Gumm Co., Irvington, N. J.  
International Chemical Co., Philadelphia, Pa.  
Magnus Chemical Co., Garwood, N. J.  
Oakite Products, Inc., New York, N. Y.

## JAPANS, ALL KINDS

Zapon Co., The, New York, N. Y.

## JAPANING BARRELS (See Tumbling Barrels.)

## JAPANING OVENS (See Ovens.)

## JEWELERS' EQUIPMENT (Also see Kind Wanted.)

Leiman Bros., New York.  
Smith-Richardson Co., Attleboro, Mass.

## JEWELERS' ROLLS (See Rolls.)

## JEWELERS' SOLDER (See Solders.)

## JIGS, FIXTURES, ETC. (See Tools, Jigs, Fixtures.)

## LABORATORIES

(See Testing Laboratories.)

## LACQUERING BARRELS (See Tumbling Barrels.)

## LACQUER ENAMELS (See Enamels.)

Egyptian Lacquer Co., New York.  
Spruance, Gilbert, Co., Philadelphia, Pa.  
Zapon, The, Co., Stamford, Conn.  
Zeller Lacquer Mfg. Co., New York.

## LACQUERS

### Colored

Agate Lacquer Co., Long Island City, N. Y.  
Egyptian Lacquer Co., New York.  
Lacquer & Chemical Corp., Brooklyn, N. Y.  
Maas & Woldstein Co., Newark, N. J.  
Roxallin Flexible Lacquer Co., Long Island City, N. Y.  
Spruance, Gilbert, Co., Philadelphia, Pa.  
Stanley Chemical Co., East Berlin, Conn.  
Zapon, The, Co., Stamford, Conn.  
Zeller Lacquer Mfg. Co., New York.  
For Incandescent Lamps  
Zapon, The, Co., Stamford, Conn.

### Metal

Agate Lacquer Co., Long Island City, N. Y.  
Apothecaries Hall Co., Waterbury, Conn.  
Egyptian Lacquer Co., New York.  
Maas & Woldstein Co., Newark, N. J.  
Roxallin Flexible Lacquer Co., Long Island City, N. Y.  
Spruance, Gilbert, Co., Philadelphia, Pa.  
Stanley Chemical Co., East Berlin, Conn.  
Zapon, The, Co., Stamford, Conn.  
Zeller Lacquer Mfg. Co., New York.

### Wood

Agate Lacquer Co., Long Island City, N. Y.  
Egyptian Lacquer Co., New York.  
Roxallin Flexible Lacquer Co., Long Island City, N. Y.  
Spruance, Gilbert, Co., Philadelphia, Pa.  
Stanley Chemical Co., East Berlin, Conn.  
Zapon, The, Co., Stamford, Conn.  
Zeller Lacquer Mfg. Co., New York.

## LACQUER REMOVERS

Egyptian Lacquer Co., New York.  
Hesse & Gumm Chemical Co., Irvington, N. J.  
International Chemical Co., Philadelphia, Pa.  
Magnus Chemical Co., Garwood, N. J.  
Roxallin Flexible Lacquer Co., Long Island City, N. Y.  
Spruance, Gilbert, Co., Philadelphia, Pa.  
Stanley Chemical Co., East Berlin, Conn.  
Zapon, The, Co., Stamford, Conn.

## LACQUER SPRAYERS (See also Sprayers.)

Eureka Pneumatic Spray Co., New York.

## LADLE HEATERS AND DRYERS

Monarch Engineering & Mfg. Co., Baltimore, Md.

## LATHES (See also Polishing Lathes.)

Columbia Electric Mfg. Co., Cleveland, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Electric  
Columbia Electric Mfg. Co., Cleveland, Ohio.  
Polishing  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Spinning  
Prybil Machine Co., New York, N. Y.

## LEAD BURNING

Abernethy, John F., & Co., Inc., Brooklyn, N. Y.

## LEAD-LINED TANKS (See Tanks.)

## LEATHER POLISHING WHEELS (See Buffing and Polishing Wheels.)

## LOCOMOTIVES, INDUSTRIAL (Inquire)

The Metal Industry.

## LUBRICANTS, Cutting and Grinding, Drawing, Stamping

International Chemical Co., Philadelphia, Pa.  
Magnus Chemical Co., Garwood, N. J.  
Oakite Products, Inc., New York, N. Y.

## MACHINERY

Cleaning Metal (Mech.)  
N. Ransohoff, Inc., Cincinnati, Ohio.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Tolhurst Machine Works, Inc., Troy, N. Y.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

### Dry Metal (Mech.)

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Tolhurst Machine Works, Inc., Troy, N. Y.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

### Metal Drying

Ransohoff, N. Co., Inc., Cincinnati, Ohio.  
Tolhurst Machine Works, Inc., Troy, N. Y.

### Metal Working

Prybil Machine Co., New York, N. Y.

### Pickling Metal (Mech.)

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
N. Ransohoff, Inc., Cincinnati, Ohio.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

### Galvanizing (Mechanical)

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

### Plating (Mechanical)

Connecticut Dynamo & Motor Co., Irvington, N. J.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## MAGNETIC SEPARATORS (See also reclaiming Machinery.)

## MANGANESE

Metal & Thermit Corp., New York.

## MANGANESE-COPPER (Also see Ingots.)

Ajax Metal Co., Philadelphia, Pa.  
Metal & Thermit Corp., New York.

## MANTLE DIP

Zapon Co., The, Stamford, Conn.

## MELTING FURNACES (Also see Burners; Galvanizing and Tinning Furnaces; Tank Furnaces.)

Coal and Coke  
Monarch Engineering & Mfg. Co., Baltimore, Md.

Oil or Gas  
Monarch Engineering & Mfg. Co., Baltimore, Md.

### Pit

Monarch Engineering & Mfg. Co., Baltimore, Md.

Stevens, Inc., Frederic B., Detroit, Mich.

### Reverberatory

Monarch Engineering & Mfg. Co., Baltimore, Md.

## METAL BRIQUETTES (See Briquet-Ingots.)

## METAL CLEANERS (See also Cleaning Compounds.)

Cowles Detergent Co., Cleveland, Ohio.  
Ford, J. B., Co., Wyandotte, Mich.  
Fuller, W. A., Co., Greensburg, Pa.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
Hesse & Gumm Chemical Co., Irvington, N. J.  
International Chemical Co., Philadelphia, Pa.  
MacDermid, Inc., Waterbury, Conn.  
Magnus Chemical Co., Garwood, N. J.  
Magnuson Products Corp., Brooklyn, N. Y.  
Oakite Products, Inc., New York, N. Y.  
Sulphur Products Co., Greensburg, Pa.

## METAL DEALERS (Also see Drosses, Residues, Etc., Buyers of; Turnings, Chips, Etc., Buyers of.)

Gold, Silver, Platinum

Radnai, Josef, New York.

Roesler & Hasselacher Chemical Co., New York.

### Old Metals

Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.

### Rare Metals

Radnai, Josef, New York.

## METAL DRYERS, CENTRIFUGAL

Ransohoff, N., Inc., Cincinnati, Ohio.

## METAL GOODS MADE TO ORDER (Also see Stamping and Drawing.)

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## METAL POLISH

Harrison & Co., Groveland, Mass.  
Lea Mfg. Co., Waterbury, Conn.  
Matchless Metal Polish Co., Chicago, Ill.—Glen Ridge, N. J.

## METAL RECLAIMING EQUIPMENT (See Concentrating Tables; Crushers and Pulverizers; Magnetic Separators.)

## METAL SPECIALTIES

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## METALS (See also Kinds Wanted. Also Metal Dealers.)

### Acid Resistant

The Duriron Co., Dayton, Ohio.  
Riverside Metal Co., Riverside, N. J.

### Bearing

American Brass Co., Waterbury, Conn.

Extruded and Die Pressed  
American Brass Co., Waterbury, Conn.

## METALS, PLATED SHEET (See Plated and Polished Sheet Metals; Sheets.)

## METALS, RARE (See Metal Dealers.)

## MILLS, CRUSHING (See also Crushers and Pulverizers.)

## MOLD DRYERS, PORTABLE

Monarch Engineering & Mfg. Co., Baltimore, Md.

## MOLDING SAND (See Sand.)

## MOLDINGS & EXTRUDED SHAPES

Aluminum

## MOLDS (See also Mold Makers.)

Babbitt and Solder

Schweizer, Chas. K., St. Louis, Mo.

### Ingot

Schweizer, Chas. K., St. Louis, Mo.

## MOLD SPRAYERS (See Sprayers.)

## MOTOR CONTROL EQUIPMENT (See also Electrical Apparatus and Equipment.)

## MOTORS (Also see Electrical Apparatus and Equipment.)

Electric Products Co., The, Cleveland, O.

### Electric

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## MOTOR-GENERATOR SETS (Also see Dynamos; Electrical Apparatus and Equipment.)

Boisier Electric Co., New York.

Chandeyson Electric Co., St. Louis, Mo.

Connecticut Dynamo & Motor Co., Irvington, N. J.

Crown Rheostat & Supply Co., Chicago, Ill.

Electric Products Co., The, Cleveland, O.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

L'Hommedieu, Chas. F., & Sons, Chicago, Ill.

Stutz, Geo. A., Mfg. Co., Chicago, Ill.

Stevens, Inc., Frederic B., Detroit, Mich.

### Plating and Galvanizing

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## MUFFLES

Dixon, Joseph, Crucible Co., Jersey City, N. J.

## MUNTZ METAL (See Sheets.)

## MUSIC ENGRAVERS' PLATES

Standard Rolling Mills, Inc., Brooklyn, N. Y.

## NICKEL (See Anodes; Castings; Sheets; Wire, Etc.)

## NICKEL CARBONATE, MOIST AND DRY

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
McGean Chemical Co., The, Cleveland, Ohio.

## NICKEL CHLORIDE

Cooper & Co., Chas., New York.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Harshaw Chemical Co., The, Cleveland, Ohio.

McGean Chemical Co., The, Cleveland, Ohio.

Roesler & Hasselacher Chemical Co., New York, N. Y.

## NICKEL DETERMINATION APPARATUS

Hellige, Inc., New York.

## NICKEL SALTS

Apothecaries Hall Co., Waterbury, Conn.

Crown Rheostat & Supply Co., Chicago, Ill.

Daniels & Orben Co., New York.

Hanson-Van Winkle-Munning Co., Matawan, N. J.

Harshaw Chemical Co., The, Cleveland, Ohio.

MacDermid, Inc., Waterbury, Conn.

McGean Chemical Co., The, Cleveland, Ohio.

Roesler & Hasselacher Chemical Co., New York.

Stevens, Frederic B., Detroit, Mich.



# BUYERS' GUIDE: ADVERTISERS' PRODUCTS

(Advertisers are entitled to one listing for each sixteenth page of space)

## NICKEL SHOT

Seymour Mfg. Co., Seymour, Conn.

## NICKEL SILVER (See also Brass, Sheets, Wire, Rod, Tube Castings; Forgings, Sheets; etc.)

Riverside Metal Co., Riverside, N. J.  
Western Cartridge Co., Alton, Ill.  
Sheets, Wire, Rod, Tube  
American Brass Co., Waterbury, Conn.  
Conklin, T. E., Brass & Copper Co., New York.  
Riverside Metal Co., Riverside, N. J.  
Seymour Mfg. Co., Seymour, Conn.  
Waterbury Rolling Mills, Waterbury, Conn.

## NICKEL SULPHATE, SINGLE AND DOUBLE

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
McGean Chemical Co., The, Cleveland, Ohio.

## OIL BURNERS (See Burners.)

Monarch Eng. & Manufacturing Co., Baltimore, Md.

## OIL PUMPS (See also Oil Storage Systems.)

Monarch Engineering & Mfg. Co., Baltimore, Md.

## OLD METALS (See Drosses, Residues, Etc., Buyers of; Metal Dealers.)

## OPTICAL BRONZE

Riverside Metal Co., Riverside, N. J.

## OVENS (Also see Burners; also Core Ovens.)

Enameling, Lacquering, Japanning  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.  
Monarch Eng. & Manufacturing Co., Baltimore, Md.  
Steiner & Co., E. E., Newark, N. J.

## OVEN BURNERS (See Burners.)

## OVEN INSULATION (See Brick, Insulating; Insulating Cement; Insulation.)

## OXIDIZING SOLUTIONS

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Sulphur Products Co., Greensburg, Pa.

## PAINT SPRAYERS (See Sprayers.)

## PATTERN SHOP EQUIPMENT (See Lathes; Saws.)

## PAVING BRICK, CORK (See Brick.)

## PEWTER

Alpha Metal & Rolling Mills, Inc., Brooklyn, N. Y.  
Standard Rolling Mills, Inc., Brooklyn, N. Y.

## PHOSPHOR BRONZE (See also Ingots.)

Ajax Metal Co., Philadelphia, Pa.  
Riverside Metal Co., Riverside, N. J.  
Western Cartridge Co., Alton, Ill.

## PHOSPHORIZERS (See Graphite Products.)

## PHOSPHOR-COPPER (Also see Ingots.)

Ajax Metal Co., Philadelphia, Pa.

## PHOSPHOR-TIN (See also Ingots.)

Ajax Metal Co., Philadelphia, Pa.

## PHOSPHORUS

General Chemical Co., Philadelphia, Pa.

## PICKLING TANKS

American Hard Rubber Co., New York, N. Y.  
General Ceramics Co., New York, N. Y.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.  
U. S. Stoneware Co., New York.

## PIPE, BRASS AND COPPER

American Brass Co., Waterbury, Conn.

## PIPE AND BOILER COVERINGS, STEAM, ICE WATER, BRINE (See also Insulation.)

## PIPE AND FITTINGS

Acid Proof  
Duriron, The, Co., Inc., Dayton, Ohio.  
Acid Proof, Hard Rubber.  
American Hard Rubber Co., New York.

## PISTON, RODS, TOBIN BRONZE

American Brass Co., Waterbury, Conn.

## PLATED AND POLISHED SHEET METALS (See also Sheets.)

American Nickeloid Co., Peru, Ill.

## PLATERS' BRUSHES (See Brushes.)

## PLATERS' BUCKETS, DIPPERS & PITCHERS

Belke Mfg. Co., Chicago, Ill.

## PLATERS' COMPOUND (See Whale Oil Soap.)

## PLATERS' METAL

Riverside Metal Co., Riverside, N. J.

## PLATERS' SUPPLIES

Beam-Knodel, Inc., New York.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Munning & Munning, Inc., Philadelphia, Pa.

## PLATING

American Hard Rubber Co., New York, N. Y.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## Cadmium (Inquire)

The Metal Industry, New York.

## Chromium—Job and Contract (Inquire)

The Metal Industry, New York  
Udylite Process Co., Detroit, Mich.

## RHODIUM

Cohn, Sigmund, New York.

## PLATING BARRELS, ROTARY

Belke Mfg. Co., Chicago, Ill.  
Connecticut Dynamo & Motor Co., Irvington, N. J.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Stevens, Inc., Frederic B., Detroit, Mich.

## PLATING AND GALVANIZING BARRELS

Belke Mfg. Co., Chicago, Ill.  
Connecticut Dynamo & Motor Co., Irvington, N. J.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Daniels & Orben Co., Inc., New York.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Munning & Munning, Inc., Philadelphia, Pa.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Stuts, Geo. A., Mfg. Co., Chicago, Ill.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## PLATING AND GALVANIZING MACHINES, AUTOMATIC (Also see Plating Barrels.)

Crown Rheostat & Supply Co., Chicago, Ill.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Munning & Munning, Inc., Philadelphia, Pa.  
Stevens, Inc., Frederic B., Detroit, Mich.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## PLATING BARREL METHOD, JOB AND CONTRACT (See Electrotyping.)

## PLATING EQUIPMENT AND SUPPLIES (See also Kind Wanted.)

Connecticut Dynamo & Motor Co., Irvington, N. J.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Daniels & Orben Co., Inc., New York, N. Y.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Munning & Munning, Inc., Philadelphia, Pa.  
Stevens, Inc., Frederic B., Detroit, Mich.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## PLATING GENERATORS

Chandeysson Electric Co., St. Louis, Mo.  
Columbia Electric Mfg. Co., Cleveland, Ohio.  
Connecticut Dynamo & Motor Co., Irvington, N. J.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Electric Products Co., The, Cleveland, O.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Holland, J., & Sons, Brooklyn, N. Y.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.  
Stevens, Inc., Frederic B., Detroit, Mich.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## PLATING MATERIALS

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harshaw Chemical Co., Cleveland, Ohio.  
Munning & Munning, Inc., Philadelphia, Pa.  
McGean Chemical Co., The, Cleveland, Ohio.  
Stevens, Inc., Frederic B., Detroit, Mich.

## PLATING RACKS

American Hard Rubber Co., New York  
Belke Mfg. Co., Chicago, Ill.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Kirk & Blum Mfg. Co., The, Cincinnati, Ohio.

## PLATING SOLUTION AGITATOR

Belke Mfg. Co., Chicago, Ill.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

## PLATING SOLUTION FILTER SYSTEM

Belke Mfg. Co., Chicago, Ill.

## PLATING SOLUTION TESTERS

Hellige, Inc., New York.

## PLATINUM (See Smelters and Refiners; Anodes; Bars; Metal Dealers; Sheets; Etc.)

## PLATINUM BUFFING CAKE (See Buffing and Polishing Compositions.)

## POLISHERS, FLOOR AND BENCH

Astle, H. J., & Co., Providence, R. I.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Stevens, Inc., Frederic B., Detroit, Mich.

## POLISHING ABRASIVES

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harrison & Co., Haverhill, Mass.  
Keystone Emery Mills, Philadelphia, Pa.  
MacFarland Mfg. Co., New York.  
McAleer Mfg. Co., Detroit, Mich.  
Norton Co., Worcester, Mass.  
Zucker Sons Co., Inc., Roselle, N. J.

## POLISHING BENCHES

Leiman Bros., New York.

## POLISHING COMPOSITIONS (See Buffing and Polishing Compositions.)

Crown Rheostat & Supply Co., Chicago, Ill.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harrison & Co., Groveland, Mass.  
Len Mfg. Co., The, Waterbury, Conn.  
MacFarland Mfg. Co., New York.  
Matchless Metal Polish Co., Glen Ridge, N. J.—Chicago.

McAleer Mfg. Co., Detroit, Mich.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Zucker Sons Co., Inc., Roselle, N. J.

## POLISHING DUST COLLECTING OUTFITS Small

Astle & Co., Inc., H. J., Providence, R. I.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.  
Leiman Bros., New York.

## POLISHING EQUIPMENT AND SUPPLIES (See also Kinds Wanted.)

Beam-Knodel, Inc., New York.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Stevens, Inc., Frederic B., Detroit, Mich.

## POLISHING FELTS

Eastern Felt Co., Winchester, Mass.  
MacFarland Mfg. Co., New York.

## POLISHING HOODS (See Dust Collectors and Ventilating Systems; Hoods.)

## POLISHING LATHES AND HEADS Electric

Columbia Electric Mfg. Co., Cleveland, Ohio.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Electric Products Co., Cleveland, Ohio.  
Hammond Machinery Builders, Inc., Kalamazoo, Mich.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.  
Stevens, Inc., Frederic B., Detroit, Mich.  
Stuts, Geo. A., Mfg. Co., Chicago, Ill.

## POLISHING MACHINES (Also see Polishing Lathes and Heads.)

Automatic  
Acme Mfg. Co., Detroit, Mich.  
Columbia Electric Mfg. Co., Cleveland, Ohio.  
Hammond Machinery Builders, Inc., Kalamazoo, Mich.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Stevens, Inc., Frederic B., Detroit, Mich.

## POLISHING MATERIALS

Beam-Knodel, Inc., New York.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harrison & Co., Haverhill, Mass.  
Keystone Emery Mills, Philadelphia, Pa.  
Matchless Metal Polish Co., Glen Ridge, N. J.—Chicago.  
MacFarland Mfg. Co., New York.  
McAleer Mfg. Co., Detroit, Mich.  
Zucker Sons Co., Roselle, N. J.

## POLISHING MOTORS, ELECTRIC (See Polishing Lathes.)

## POLISHING AND BURNISHING; JOB AND CONTRACT (See also Electro Plating.)

## POLISHING AND GRINDING ENGINEERS (See Engineers.)

Divine Bros. Co., Utica, N. Y.

## POLISHING GRAIN

Keystone Emery Mills Co., Philadelphia, Pa.

## POLISHING WHEELS (See also Buffing and Polishing Wheels.)

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.  
MacFarland Mfg. Co., New York.  
Yerges Buff Co., Toledo, Ohio.

## POTASH

First Sorts  
Harshaw Chemical Co., The, Cleveland, Ohio.  
International Chemical Co., Philadelphia, Pa.

Real  
Harshaw Chemical Co., The, Cleveland, Ohio.  
International Chemical Co., Philadelphia, Pa.

## POTASSIUM CYANIDE

Harshaw Chemical Co., The, Cleveland, Ohio.  
Roessler & Haselacher Chemical Co., New York

## POTENTIOMETER FOR pH CONTROL

Hellige, Inc., New York.

## POWDERED COAL BURNERS (See Burners.)

## PRESSES (Also see Scrap Baling Machine.)

Bench and Foot  
Baird Machine Co., Bridgeport, Conn.  
United Engineering & Fdy. Co., Pittsburgh, Pa.  
Cabbaging  
United Engineering & Fdy. Co., Pittsburgh, Pa.  
Power, All Types  
Baird Machine Co., Bridgeport, Conn.  
Schloemann Eng. Co., Pittsburgh, Pa.  
United Engineering & Fdy. Co., Pittsburgh, Pa.

## PRESSES, DROP LIFTERS FOR

United Engineering & Fdy. Co., Pittsburgh, Pa.

## PRESSURE BLOWERS (See Blowers and Blow-Piping.)

# BUYERS' GUIDE: ADVERTISERS' PRODUCTS

(Advertisers are entitled to one listing for each sixteenth page of space)

## PULVERIZERS

Standard Equipment Co., New Haven, Conn.

## PUMPS

Centrifugal. Acid Proof  
Hard Rubber. Acid Proof  
American Hard Rubber Co., New York.  
Reciprocating. Acid Proof

## PYROMETERS

The Metal Industry.

## PYROMETERS, INDICATING AND RECORDING

## RACKS—Rubber Covering for

American Hard Rubber Co., New York.  
Belke Mfg. Co., Chicago, Ill.

## Plating

Belke Mfg. Co., Chicago, Ill.  
Connecticut Dynamo & Motor Co., Irvington, N. J.

## RECLAIMING MACHINERY; METAL (Also see Concentrating Tables; Crushers and Pulverizers; Magnetic Separators.)

Standard Equipment Co., New Haven, Conn.

## RECORDING THERMOMETERS (See Thermometers.)

## REGULATORS

## RESPIRATORS

Chicago Eye Shield Co., Chicago, Ill.

## RETORTS, GRAPHITE

Dixon, Joseph, Crucible Co., Jersey City, N. J.  
McCullough-Dalzell Crucible Co., Pittsburgh, Pa.  
Plumbago Crucible Association, The, New York.

## RHEOSTATS (See also Electrical Apparatus and Equipment.)

Beam-Knodel, Inc., New York.  
Belke Mfg. Co., Chicago, Ill.  
Columbia Electric Mfg. Co., Cleveland, Ohio.  
Connecticut Dynamo & Motor Co., Irvington, N. J.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Daniels & Orben Co., New York.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
L'Hommedieu, Chas. F., & Sons, Chicago, Ill.

## RHODIUM PLATING

Cohn, Sigmund, New York.

## RIDDLES (See Foundry Riddles.)

## RODS AND BARS (Also see Brass Mill Products.)

Aluminum  
British Aluminum Co., Ltd., New York-Toronto, Canada.

Brass, Bronze and Copper  
American Brass Co., Waterbury, Conn.  
Conklin, T. E., Brass & Copper Co., New York.

## ROLLING MILL MACHINERY (See also Draw Benches; Hydraulic Machinery; Presses; Rolls; Shears; Slitters.)

Farrel-Birmingham Co., Inc., Ansonia, Conn.  
Leiman Bros., New York.  
Schloemann Eng. Co., Pittsburgh, Pa.  
United Engineering & Fdy Co., Pittsburgh, Pa.  
Yoder, The, Co., Cleveland, Ohio.

## ROLLS

Chilled and Sand Iron  
United Engineering & Fdy Co., Pittsburgh, Pa.  
Jewelers  
Leiman Bros., New York.

## ROUGE (See also Buffing and Polishing Compositions.)

Harrison & Co., Haverhill, Mass.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
MacFarland Mfg. Co., New York.  
McAler Mfg. Co., Detroit, Mich.  
Matchless Metal Polish Co., Glen Ridge, N. J.—Chicago.  
Zucker Sons Co., Inc., Roselle, N. J.

## RUBBER TANKS

American Hard Rubber Co., New York.  
Belke Mfg. Co., Chicago, Ill.

## RUST PREVENTATIVES

Hesse & Gumm Chemical Co., Irvington, N. J.  
International Chemical Co., Philadelphia, Pa.  
Magnus Chemical Co., Garwood, N. J.  
Oakite Products, Inc., New York, N. Y.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.

## RUST PROOF PROCESS

Graswell Chemical Co., The, Inc., Cleveland, Ohio.  
Roessler & Hasslacher Chemical Co., New York, N. Y.  
Udyllite Process Co., Detroit, Mich.

## RUST REMOVERS

International Chemical Co., Philadelphia, Pa.

## SAND

For Sand Blasting  
Standard Equipment Co., New Haven, Conn.

## SAND BLASTS

### Accessories

Leiman Bros., New York, N. Y.  
Langborn Corp., Hagerstown, Md.  
Standard Equipment Co., New Haven, Conn.

### Barrel

Leiman Bros., New York, N. Y.  
New Haven Sand Blast Co., New Haven, Conn.  
Standard Equipment Co., New Haven, Conn.

### Cabinet

Astle, H. J., & Co., Providence, R. I.  
Leiman Bros., New York, N. Y.  
Standard Equipment Co., New Haven, Conn.

### Sand Blast Systems

Leiman Bros., New York, N. Y.  
New Haven Sand Blast Co., New Haven, Conn.  
Standard Equipment Co., New Haven, Conn.

## SAND BLASTS AND EQUIPMENT

Leiman Bros., New York, N. Y.  
Standard Equipment Co., New Haven, Conn.

## SAWDUST DRYING-OUT BOXES (Also see Drying-Out Machines.)

Ransohoff, N., Inc., Cincinnati, Ohio.  
Smith-Richardson Co., Attleboro, Mass.

## SAWDUSTLESS METAL DRYERS (Inquire)

The Metal Industry.

## SCRAP METAL DEALERS (See Drosses, Residues, Etc., Buyers of; Turnings, Chips, Etc., Buyers of; Metal Dealers.)

## SCREW DRIVERS, ELECTRIC

## SEPARATORS, MAGNETIC (See Magnetic Separators.)

## SHEARS (See Slitters.)

Schloemann Eng. Co., Pittsburgh, Pa.

## SHEEPSKIN POLISHING WHEELS

Codman, F. L., & J. C. Co., So. Boston, Mass.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
MacFarland Mfg. Co., New York.

## SHEET FELT

Eastern Felt Co., Winchester, Mass.  
MacFarland Mfg. Co., New York.

## SHEET LEAD

Standard Rolling Mills, Inc., Brooklyn, N. Y.

## SHEET METAL PIPING FOR ALL PURPOSES

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## SHEET METAL SPECIALTIES

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## SHEET METAL WORK

Allington & Curtis Co., Saginaw, Mich.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## SHEETS (Also see Brass Mill Products Strip Metal.)

### Aluminum

British Aluminum Co., Ltd., New York-Toronto, Canada.

Strabs Aluminum Co., New York.

### Brass, Copper and Nickel-Silver

American Brass Co., Waterbury, Conn.  
Bristol Brass Co., Bristol, Conn.  
Conklin, T. E., Brass & Copper Co., New York  
New England Brass Co., Taunton, Mass.  
Riverside Metal Co., Riverside, N. J.  
Seymour Mfg. Co., Seymour, Conn.  
Waterbury Rolling Mills, Waterbury, Conn.

### Bronze

Conklin, T. E., Brass & Copper Co., New York.  
New England Brass Co., Taunton, Mass.  
Riverside Metal Co., Riverside, N. J.

### Copper

Conklin, T. E., Brass & Copper Co., New York.  
Hussey, C. G., & Co., Pittsburgh, Pa.

### Muntz's Metal

### Nickel-Silver

New England Brass Co., Taunton, Mass.  
Riverside Metal Co., Riverside, N. J.  
Seymour Mfg. Co., Seymour, Conn.  
Waterbury Rolling Mills, Waterbury, Conn.

### Plated and Polished

American Nickeloid Co., Peru, Ill.

### Platinum

Roessler & Hasslacher Chemical Co., New York.

## Silver, Sterling

Handy & Harmon, New York.  
Jackson, John J., Co., Newark, N. J.

## Zinc

Illinois Zinc Co., Peru, Ill.  
Matthiesen & Hegeler Zinc Co., La Salle, Ill.

## SHERARDIZING (Inquire)

The Metal Industry, New York.

## SHERARDIZING FURNACES AND EQUIPMENT

New Haven Sherardizing Co., Hartford, Conn.

## SILICON COPPER

Ajax Metal Co., Philadelphia, Pa.

## SILVER CHLORIDE

Cooper, Chas., & Co., New York, N. Y.

## SILVER SOLDER

Handy & Harmon Co., New York, N. Y.

## SILVER CYANIDE

Roessler & Hasslacher Chemical Co., New York.

## SILVER DRIP RACKS

General Ceramics Co., New York, N. Y.

## SLAB ZINC

Hegeler Zinc Co., Danville, Ill.  
Matthiesen & Hegeler Zinc Co., La Salle, Ill.

## SLITTERS, SHEET METAL (See Shears.)

## SMELTERS AND REFINERS (Also see Ingots.)

Copper-Bearing Material  
Ajax Metal Co., Philadelphia, Pa.

### Gold

Handy & Harmon Co., New York, N. Y.

### Platinum

Roessler & Hasslacher Chemical Co., New York.

### Silver

Handy & Harmon Co., New York, N. Y.

## SOAP AND SOAP CHIPS

Hesse & Gumm Chemical Co., Irvington, N. J.  
International Chemical Co., Philadelphia, Pa.  
Magnus Chemical Co., Garwood, N. J.

## SODIUM CYANIDE

American Cyanamid Co., New York.  
Daniels & Orben Co., New York.  
Harshaw Chemical Co., The, Cleveland, Ohio.  
Roessler & Hasslacher Chemical Co., New York.

## SOLDER

### Aluminum

All Kinds  
Standard Rolling Mills, Inc., Brooklyn, N. Y.

## SOLDER MOLDS (See Molds.)

## SOLUTION FILTER SYSTEM

Belke Mfg. Co., Chicago, Ill.

## SOLUTIONS, OXIDIZING

Nickel  
Sulphur Products Co., Greensburg, Pa.

## SOLUTION TESTERS

Hellige, Inc., New York.

## SOLVENTS

Egyptian Lacquer Co., New York.  
Maas & Waldstein Co., Newark, N. J.  
Roxall Flexible Lacquer Co., Long Island City, N. Y.  
Spruance Co., Gilbert, Philadelphia, Pa.  
Zapon Co., The, Stamford, Conn.  
Zeller Lacquer Mfg. Co., New York.

## SPECIAL MACHINERY FOR NON-FERROUS MANUFACTURING

Schloemann Eng. Co., Pittsburgh, Pa.  
Torrington Mfg. Co., Torrington, Conn.

## SPECIALTIES, METAL (See Wire Specialties; Wire Shapers and Forms; Metal Goods Made to Order.)

## SPELTER (See Slab Zinc; also see Ingots.)

## SPELTER CHUCKS (See Chucks.)

## SPINNING LATHES (See also Lathes.)

Prybil, P., Machine Co., New York.

## SPRAY BOOTHS

Kirk & Blum Mfg. Co., The, Cincinnati, Ohio.

## SPRAYERS

Lacquer, Enamel, Japan, Paint  
Eureka Pneumatic Spray Co., New York.

## SPRAYING ACCESSORIES, HOODS, TABLES, ETC. (Inquire)

Eureka Pneumatic Spray Co., New York.

## SPRAYING EQUIPMENT, PORTABLE

(Inquire)  
Eureka Pneumatic Spray Co., New York.



# BUYERS' GUIDE: ADVERTISERS' PRODUCTS

(Advertisers are entitled to one listing for each sixteenth page of space)

## STAINLESS STEEL COMPOSITIONS

Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Harrison & Co., Haverhill, Mass.  
MacFarland Mfg. Co., New York.  
Matchless Metal Polish Co., Glen Ridge, N. J.  
McAleer Mfg. Co., Detroit, Mich.

## STAMPING AND DRAWING JOB AND CONTRACT (Also see Metal Goods Made to Order.)

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## STAMPING AND DRAWING LUBRICANTS

Magnus Chemical Co., Garwood, N. J.

## STEAM BOILERS, GAS FIRED

Mears-Kane-Ofeldt, Phila., Pa.

## STEEL BALLS FOR BURNISHING BARRELS

Abbott Ball Co., Hartford, Conn.  
Baird Machine Co., Bridgeport, Conn.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Hartford Steel Ball Co., The, Hartford, Conn.  
L'Hommiedieu, Chas. F., & Sons, Chicago, Ill.  
Smith-Richardson Co., Attleboro, Mass.

## STEEL RACKS AND PANS

Kirk & Blum Mfg. Co., Cincinnati, Ohio.

## STOKERS, CHAIN GRATE

Wood Waste  
Allington & Curtis Co., Saginaw, Mich.  
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## STONEWARE, ACID-PROOF (See also Acid Pumps; Dipping Baskets.)

General Ceramics Co., New York.  
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## STRAIGHTENING, CUTTING AND FORMING MACHINERY (See Cutting, Straightening and Forming Machinery.)

## STRIP METAL IN COIL AND ROLLS

(Also see Brass Mill Products.)  
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## STRIP ROLLING MACHINE

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Yoder, The, Co., Cleveland, Ohio.

## SULPHATE OF SODA

Mutual Chemical Co. of America, New York.

## SULPHOCYANIDE OF SODA

Roesler & Hasslacher Chemical Co., New York.  
Zapon Co., The, Stamford, Conn.

## SULPHURIC ACID

Mutual Chemical Co. of America, New York.

## SULPHUR LIQUID

Sulphur Products Co., Greensburg, Pa.

## SWEET SMELTERS (See Smelters and Refiners.)

## TANK FILTER

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## TANKS

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Hanson-Van Winkle-Munning Co., Matawan, N. J.  
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Hard Rubber  
American Hard Rubber Co., New York.  
Belke Mfg. Co., Chicago, Ill.

Lead Lined  
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Kirk & Blum Mfg. Co., Cincinnati, Ohio.

Pickling  
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U. S. Stoneware Co., New York.

Plating  
Boissier Elec. Corp., New York, N. Y.  
Connecticut Dynamo & Motor Co., Irvington, N. J.  
Crown Rheostat & Supply Co., Chicago, Ill.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Hoyer, Fred, Co., Chicago, Ill.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.  
U. S. Galvanizing & Plating Equipment Corp., Brooklyn, N. Y.  
U. S. Stoneware Co., New York.

Steel  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Kirk & Blum Mfg. Co., Cincinnati, Ohio.

Stone  
General Ceramics Co., New York.  
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Wood  
Corcoran, A. J., & Co., Jersey City, N. J.  
Hanson-Van Winkle-Munning Co., Matawan, N. J.

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Foxboro Company, The, Foxboro, Mass.

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## TESTING LABORATORIES (See also Assayers and Chemists.)

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New York Testing Laboratories, New York.  
Pitkin, Lucius, Inc., New York.  
Textor Chemical Labs., Cleveland, Ohio.

## THERMOMETERS, INDICATING

## THERMOMETERS, RECORDING

## TIN; PIG, BAR and BLOCK (See also Ingots, Tin.)

## TINNING (See Electro-Plating, Hot Galvanizing and Tinning.)

## TINNING FLUXES (See Fluxes.)

## TRIPOLI COMPOSITION

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Matchless Metal Polish Co., Glen Ridge, N. J.—Chicago.

McAleer Mfg. Co., Detroit, Mich.  
Stevens, Inc., Frederic B., Detroit, Mich.

## TRIPOLI REMOVER

Magnus Chemical Co., Garwood, N. J.

## TUBE MILL MACHINERY

Torrington Mfg. Co., Torrington, Conn.

## TUBES (Also see Aluminum and Brass Mill Products.)

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Conklin, T. E., Brass & Copper Co., New York.  
Seamless Brass and Copper  
Wells & Co., A. H., Inc., Waterbury, Conn.

## TUMBLING BARRELS (Also see Burnishing and Polishing Barrels; Plating Barrels.)

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Abbott Ball Co., Hartford, Conn.  
Baird Machine Co., Bridgeport, Conn.  
Globe Machine & Stamping Co., Cleveland, Ohio  
Hanson-Van Winkle-Munning Co., Matawan, N. J.  
Hartford Steel Ball Co., Hartford, Conn.  
Ransohoff, N., Inc., Cincinnati, Ohio.  
Stevens, Inc., Frederic B., Detroit, Mich.

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Metal & Thermit Corp., New York.

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McAleer Mfg. Co., Detroit, Mich.

## VOLTMETERS (Also see Electrical Apparatus and Equipment.)

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Electric Products Co., The, Cleveland, Ohio.  
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L'Hommiedieu, Chas. F., & Sons, Chicago, Ill.  
MacFarland Mfg. Co., New York.

## WHITE METALS (See also Smelters and Refiners; Babbit Metal; Ingots; Etc.)

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Harrison & Co., Groveland, Mass.  
Matchless Metal Polish Co., Glen Ridge, N. J.—Chicago.  
McAleer Mfg. Co., Detroit, Mich.  
Stevens, Inc., Frederic B., Detroit, Mich.

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British Aluminum Co., Ltd., New York-Toronto, Canada.

Brass, Bronze, Copper and Nickel-Silver, Etc.

American Brass Co., Waterbury, Conn.  
Conklin, T. E., Brass & Copper Co., New York.  
Riverside Metal Co., Riverside, N. J.

## WIRE FORMING MACHINERY (See also Cutting, Straightening and Forming Machinery.)

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## WIRE MILL EQUIPMENT

Schloemann Eng. Co., Pittsburgh, Pa.  
United Engineering & Fdy. Co., Pittsburgh, Pa.

## WIRE STRAIGHTENING AND CUTTING MACHINERY (See Cutting, Straightening and Forming Machinery.)

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